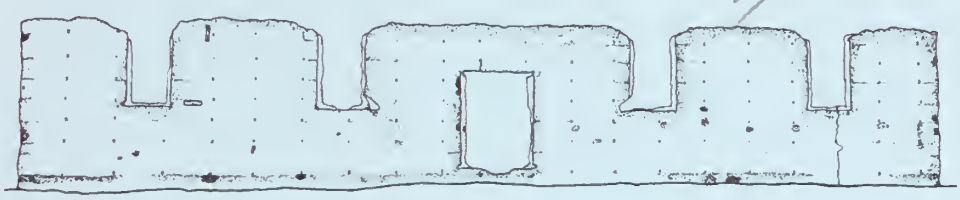
INTENSIVE ARCHAEOLOGICAL TESTING AT THE JOHN HOUSTOUN McINTOSH SUGARHOUSE CAMDEN COUNTY, GEORGIA

By
Thomas Hales Eubanks



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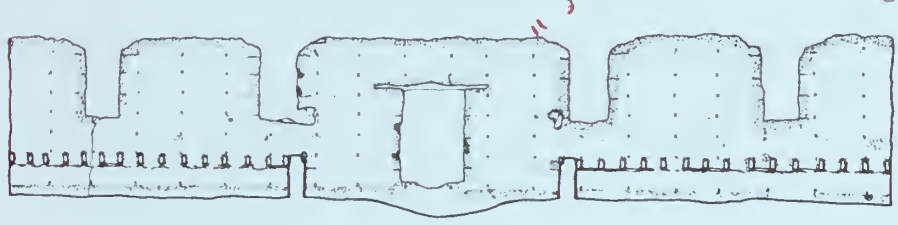
Charles H. Fairbanks
Principal Investigator



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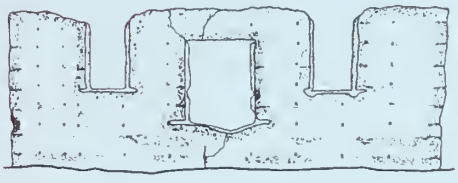

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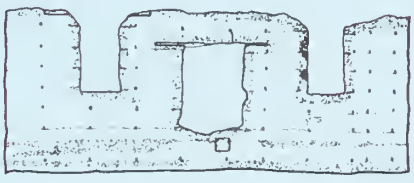

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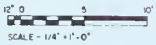

State of Georgia
Department of Natural Resources
Parks and Historic Sites Division
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1985

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INTENSIVE ARCHAEOLOGICAL TESTING AT THE JOHN HOUSTOUN McINTOSH SUGARHOUSE CAMDEN COUNTY, GEORGIA

BY

THOMAS HALES EUBANKS

CHARLES H. FAIRBANKS

PRINCIPAL INVESTIGATOR

EDITED BY

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FORWARD

The selection of Kings Bay in Camden County by the U.S. Department of the Navy as the site of a new submarine base brought prospects of new construction, additional jobs, increased revenues and an expanding population to this part of Coastal Georgia. These hopes for economic prosperity and growth were tempered by concerns for addressing and managing the inevitable environmental impact to the area. With such unusual developmental pressures on a community, ties with its cultural heritage easily can be neglected or even forgotten. Of particular concern in this case was the preservation of the tabby ruins of the John Houstoun McIntosh Sugarhouse, a highly significant 19th century mill.

Located directly across the highway from the main gate of the submarine base, and cared for by the staff of Crooked River State Park, some three miles north, the Sugarhouse ruins demanded special consideration. Through the cooperative efforts of local, state and federal officials, a strategy was developed to prevent the loss of the ruins' historical values and features as a result of the rapid development and influx of people around the base. It was agreed that the best hope of managing the ruins was at the county level as a passive recreational facility which respected the site's historical significance.

Title to the Sugarhouse was transferred from the State of Georgia to Camden County with the condition that preservation studies be conducted. An intensive archaeological survey program was then undertaken. Its purpose was to ascertain the extent, nature and significance of the Sugarhouse ruin in order to formulate interpretive and preservation recommendations for the County's use in managing the site. The report produced here documents the results of the archaeology and contains the management recommendations.

Funding for the project was provided jointly by Camden County and the Kings Bay Impact Coordinating Committee, an organization established by the U.S. Department of the Navy to help the surrounding communities deal with the impacts of the base. The archaeology was administered by the Historic Preservation Section of the Georgia Department of Natural Resources through a contract with the University of Florida. Archaeologist Thomas H. Eubanks conducted the research and field work and prepared the report. In addition, Camden County retained an architectural consultant, Brad T. Smith, then of Lee Meyer and Associates, to document the current condition of the ruins through rectified photography and drawings, and to make recommendations for stabilization of the ruins. With permission of the architects, the drawings have been reproduced and included as an appendix to the report.

The Department of Natural Resources has appreciated the opportunity to work with Camden County and the Kings Bay Impact Coordinating Committee toward the goal of preserving and interpreting the Sugarhouse ruins within the context of passive recreational activity. The ruins represent an era of economic development that once was present on Georgia's coast and help us to understand the past culture of the area. Our hope is that continued historical and archaeological research will be accommodated in the ongoing management of the John Houstoun McIntosh Sugarhouse and that this report has helped to bring an awareness of its significance to those persons who may have an opportunity to plan for its use and to visit there in the future.

Elizabeth A. Lyon
Deputy State Historic Preservation Officer
Chief, Historic Preservation Section
Department of Natural Resources
September, 1985

INTENSIVE ARCHAEOLOGICAL TESTING AT THE JOHN HOUSTOUN McINTOSH SUGARHOUSE CAMDEN COUNTY, GEORGIA

BY

THOMAS HALES EUBANKS

CHARLES H. FAIRBANKS

PRINCIPAL INVESTIGATOR

A REPORT PRESENTED TO THE GEORGIA DEPARTMENT OF NATURAL RESOURCES
HISTORIC PRESERVATION SECTION
IN FULFILLMENT OF THE REQUIREMENTS OF CONTRACT NUMBER
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1985

ACKNOWLEDGEMENTS

Charles H. Fairbanks directed all phases of this research. His advice and support continued without regard to his declining health until the time of his death. Without that assistance, guidance, and influence this project could never have advanced to the degree it has. The contributions of Dr. Fairbanks to this project as well as his contributions to the development of historic period archaeology will certainly be remembered.

Jerald Milanich stepped in after Dr. Fairbanks' death to supervise the completion of the project. He successfully pushed and prodded the author to this finished report. Without his assistance this research would have never developed to the extent that it has.

Marvin Harris has offered his synthesis of cultural materialist theory that stands as the basis of the research design for the project. His interest in industrial anthropology and the archaeology of the McIntosh Sugarhouse have encouraged the author to extend the range of the investigation in order to provide a larger context from which to understand the site.

Lewis H. Larson, Georgia State Archaeologist, whose long interest in the site and its preservation, demands special recognition. Without his dedication to the cultural resources of

Georgia, the investigation of this site and many others in the state would have never occurred. His time and energies dedicated to this project are greatly appreciated by the author.

Elizabeth A. Lyon, Deputy State Historic Preservation Officer, must also be recognized for her dedication, encouragement and understanding. Her staff not only provided for the management of the contract but technical assistance whenever requested. John R. Morgan and Morgan R. Crook made significant contributions to the completed project.

William Elder and his associates from OICC Trident gave freely of their time and resources to insure the success of the project. Also the people of Camden County, whose interest in the site as a part of their cultural heritage, encouraged the author through their unending enthusiasm. Certainly, Eloise Bailey's documentation of the history of the McIntosh family and its holdings in Camden County was invaluable to the project.

An archaeological investigation is only as good as the field work accomplished. The field crew performed at the highest level of professionalism and maintained their enthusiasm to the end. Stephanie A. Carver and Robert G. Hilliard proved most worthy assistants. Mary Beth Hutchinson and Sheree Adams were invaluable during analysis and report preparation.

The author's fellow graduate students and friends always provided advice and assistance when requested. John F. Wilson

taught the author the ins and outs of the University of Florida. Lucy B. Wayne, Karen J. Walker and Susan M. Case advised, warned and consoled the author.

The author must also thank his parents. They have made possible his education and professional development.

Finally the author would like to thank two special people. Michael Whittington gave his unyielding support and assistance throughout all phases of the research and contributed immeasurably to the success of the research. Charles Wagley not only offered his help with the development of the social history of sugar manufacturing, his anthropological insight and his encouragement, but also his friendship.

Gainesville, March 1985

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BY

THOMAS HALES EUBANKS

May 1985

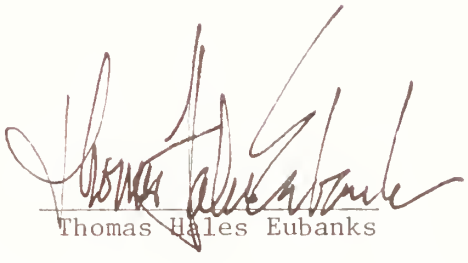
Charles H. Fairbanks,
Principal Investigator

The intensive archaeological testing program at the McIntosh Sugarhouse was funded jointly by Camden County and the Kings Bay Impact Coordinating Committee and administered by the Historic Preservation Section of the Georgia Department of Natural Resources. The purpose of the investigation was to define the extent, nature and significance of the archaeology at the nineteenth century sugarhouse ruins. A cultural materialist research strategy was employed to accomplish that end.

A social history for sugar production in America is presented in addition to a review of archaeological investigations at other sugar works sites. Areas to be excavated were determined from an activity model developed from the results of the other archaeological projects and the social history. The areas tested

included the milling room, boiling room, curing room, attached porches, well and other locations indicated by the activity model and archaeological indications.

Analysis and conclusions are presented for each of the areas tested. Additionally, individual statements on site significance, site interpretation, site management, and a site visitor plan are offered.



Thomas Hales Eubanks

CHAPTER I

INTRODUCTION

Research Design

During the months of September and October 1981, the Department of Anthropology at the University of Florida carried out a program of intensive archaeological testing at the John Houstoun McIntosh Sugarhouse and Archaeological Area, Camden County Georgia. This testing program was undertaken in order to determine the extent, nature and significance of the ruins of a nineteenth century sugarhouse and associated archaeology. The study was also designed to provide information for interpretation and management of the site.

The project was jointly funded by Camden County and the Kings Bay Impact Coordinating Committee. It was administered by the Historic Preservation Section of the Georgia Department of Natural Resources through a contract with the University of Florida. In part, the study was initiated in order to satisfy terms of a land transfer from the state to the county; this transfer established the Historic Preservation Section as the lead agency for the archaeological investigation.

Prior to the land transfer, the sugarhouse ruins and surrounding property were managed by the Parks, Recreation and Historic Sites Division of the Georgia Department of Natural Resources as a detached portion of Crooked River State Park. The property was used for

passive recreation. No attempt was made to provide active interpretation of the historic elements of the site.

With the creation of the United States Navy Submarine Support Base at Kings Bay, state park personnel found it increasingly difficult to provide proper management at the sugarhouse property. Thus, the state legislature, working with county and Navy officials, determined to transfer the extant ruins and surrounding state owned land to the county for development as a regional interpretative center.

Under county ownership, plans for developing the site include constructing a new parking facility, a regionally focused natural history museum, foot trails through the natural and historic areas of the property, and preservation of the ruins. Passive recreation will continue at the site, but will be limited to the areas that are not archaeologically or architecturally sensitive. Active interpretation of the ruins, archaeology, and ecology of the property will be accomplished.

The archaeological project designed to investigate the John Houstoun McIntosh Sugarhouse has as its epistemological base the research strategy of cultural materialism. This approach was selected because it offers specific operations to understand relationships between modes of production and reproduction, domestic economy, and political economy (Harris 1979: 51-54). Understanding these relationships is imperative if we are to know why McIntosh built the

sugarhouse, why it took the form that it did, why it was abandoned, and how it fit into a plantation system of surplus production.

Theodore Sande (1977: 40-41) and Jeffrey Brown (1980: 1) have pointed out that the analysis and interpretation of an industrial archaeological site requires that the research design be developed from the broadest possible context. This is, to say, that an industrial site cannot be fully understood only from the archaeology at the site. It is necessary to understand the economic history of the period involved, the history and evolution of the technology employed by the industry, and the history of the site, all within the context of anthropological theory.

The selection of a cultural materialist research strategy is intended to bring together these areas of understanding. In order to accomplish this, a demographic, technological, economic and environmental history, or social history, will be developed for sugar production in the Americas. This social history can be employed to integrate the sociocultural system of plantation economy and the archaeology of the McIntosh Sugarhouse.

Ecological Setting

The John Houstoun McIntosh Sugarhouse and Archaeological Area is situated in the Atlantic Coastal Plain Province, Marine Flatland Tidal Area, 4.5 miles (7.29 km) west of the confluence of Kings Bay and Cumberland Sound (Wharton 1977: 8). Today the ruins and associated

69.46 acre property are located at the intersection of state road Spur 40 and Kings Bay Road, adjacent to the main gate of the Kings Bay Navy Submarine Support Base (Figure 1).

The site is located on the Satilla terrace, which stands from sea level to 60 feet (20.4 m) in elevation. McCallie et al. (1925:25) described the terrace as having a system of complex sags and drains that form densely wooded swamps that are kept wet by annual precipitation. This upland maritime forest, non-flowing water region, is characterized by Wharton (1977:187) as an evergreen-oak dominated forest with a variety of wetland ecological communities: cypress ponds, gum ponds, bay swamps, cypress savannah, and shrub bog (Wharton 1977: 75-95).

Trees include live laural oak, American holly, Southern magnolia, red bay (Persea borbonia), Southern red cedar (Juniperus silicola), water oak, pignut hickory, cabbage palm and slash pine (Wharton 1977:187). The shrubs present are staggerbush (Lyonia feruginea), wild olive, wax myrtle and sparkleberry (Wharton 1977: 187). Herbs likely to be located in the area include panic grass (Panicum sp.), spike grass (Uliola sessiliflora), broom sedge, nut grass (Sypersu sp.), thoroughwort (Eupatorium aromaticunm), nut rush (Scleria triglomorate), and black oat grass (Stipa avenacea) (Wharton 1977: 187).

Fauna reported by Wharton for a more northern upland forest situation, also on the mainland, included broadhead skink (Eumeces laticeps), Black racer, copperhead, diamondback rattlesnake, opossum,

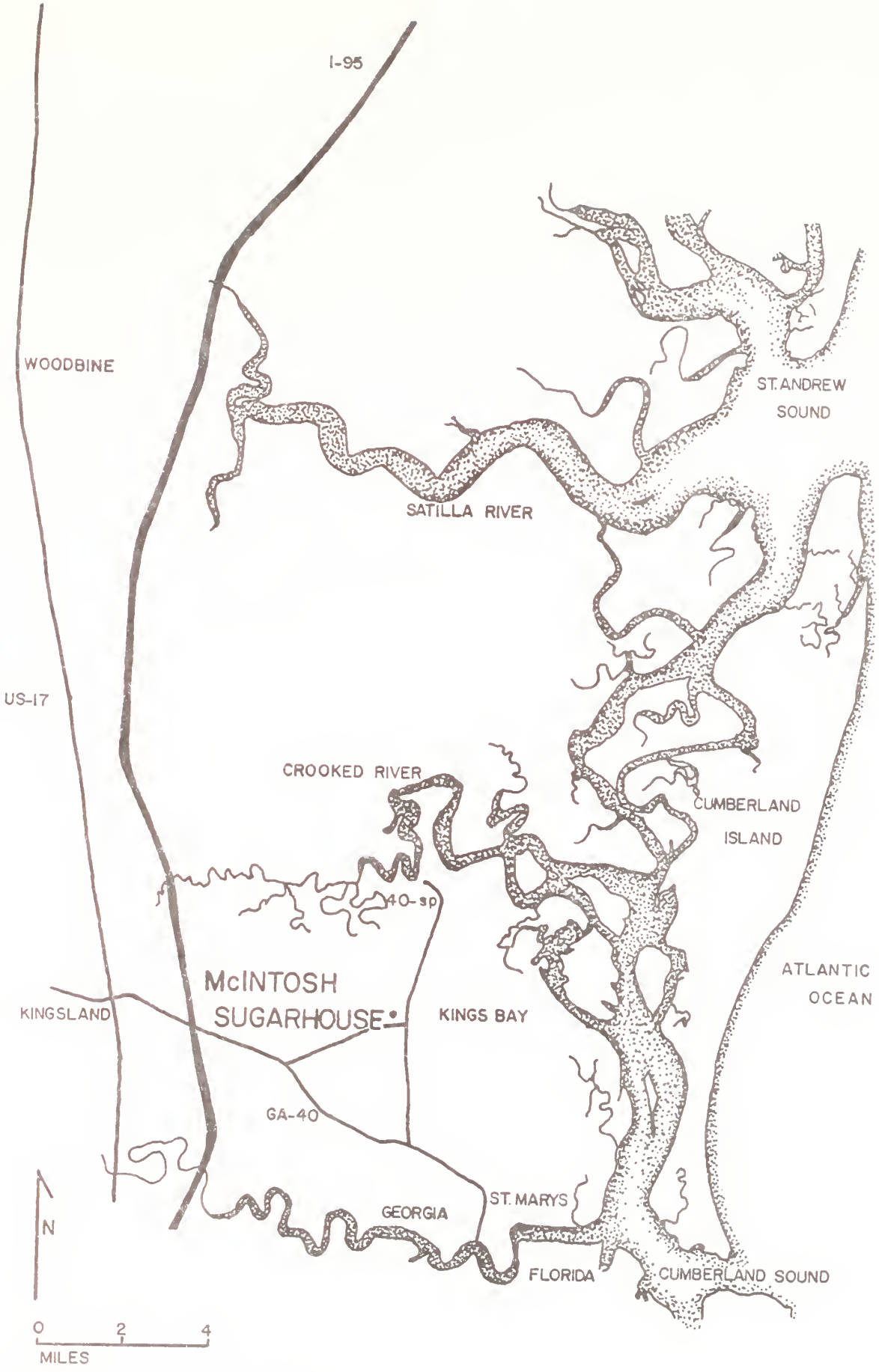


Figure 1. Site Location Map.

mole, short-tailed shrew, gray squirrel, flying squirrel, and deer (1977: 188).

Soils at the sugarhouse property are of the Mandarin-Rutlege type (U.S. Department of Agriculture 1980: 5-6). They are poorly drained fine sands. The upper unit is dark gray and about 7.6cm thick. The next unit is light gray and extends to a hardpan 49cm below the surface.

The Site

The McIntosh Sugarhouse was constructed during the first half of the nineteenth century and today is an extensive tabby ruin with an associated archaeological area. Standing walls of the structure are approximately 4.26m (14 feet) high and 35.5cm (14 inches) wide. They define a rectangular building with three large rooms and two porches (Figure 2).

These three rooms are aligned generally east-west. The east room is the largest of the rooms. The center and west rooms are the same size and the porches are the same size but they are smaller than the rooms. Total floor space for the structure is 1,965.96m sq. (6,450 square feet). That space is divided as follows: east room, 685.8m sq. (2,250 square feet), center and west rooms, 480.06m sq. each (1,175 square feet each), porches, 160.02m sq. each (525 square feet each).

The west room has four doorways. One is at ground level and connects the west room with the center room. Two doorways, also at ground level, open to the outside. One is at the east end of the

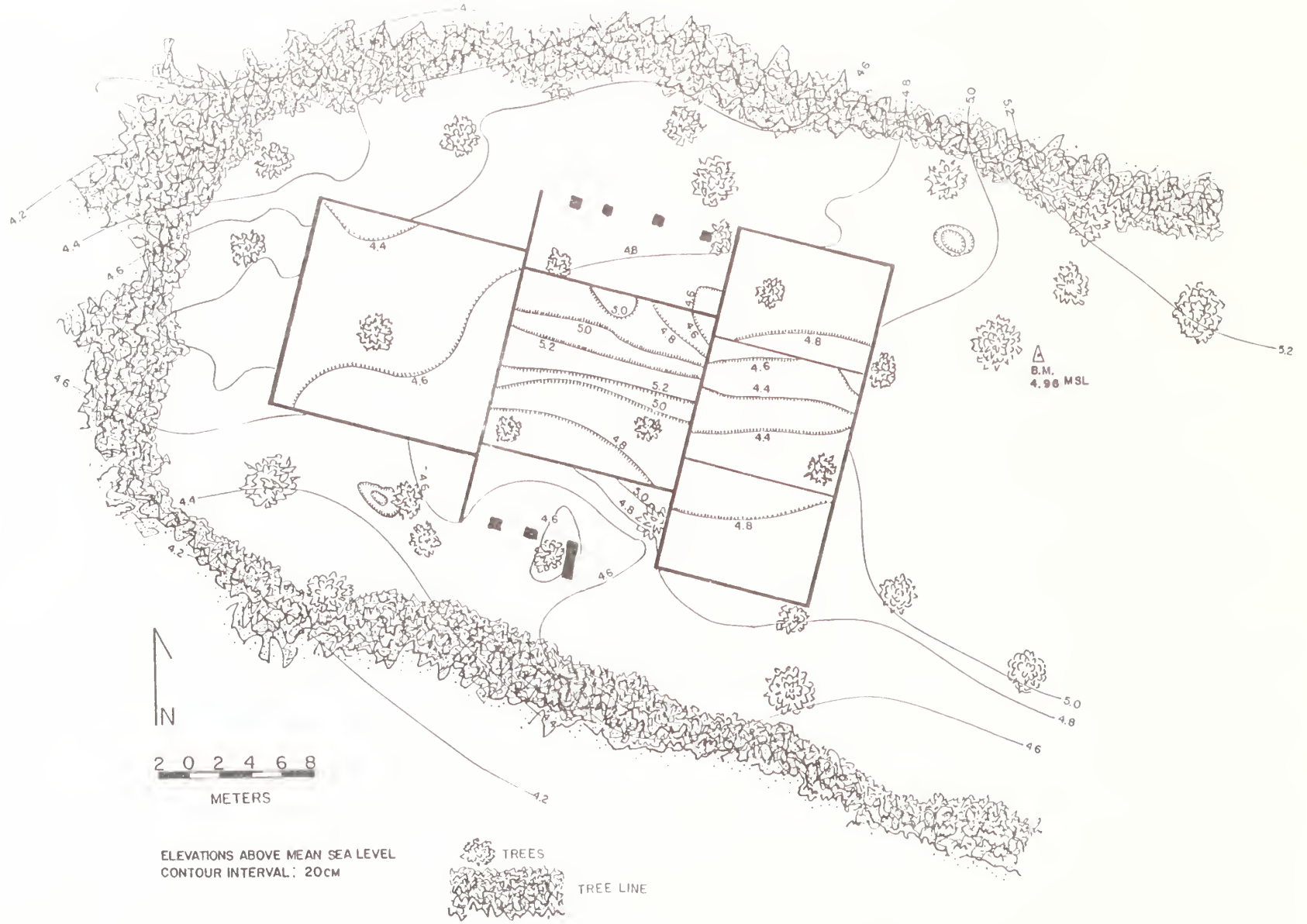


Figure 2. Site Map.

southern wall and the other is at the east end of the northern wall. The fourth doorway is located in the northern wall approximately 2.13m above ground level. This elevated placement of the door indicates that the room had a second story or loft.

The west room has six large windows. Three of these are located in each of the exterior walls and are near ground level. There are also 27 small slot-like windows located in the exterior walls about 2.4m above ground level (Figure 3).

The center room has two doorways, one opens to the west room and one opens to the east room. Two large windows open to the south porch and two others open to the north porch. There are two other openings to the north porch and are described by James Ford as "arched doorways" (1937:215). The significance of these openings will be discussed later. Further there is a small opening to the south porch which will also be discussed later.

In addition to the doorway from the center room, the east room has three other door openings, all to the outside of the structure. One is located in the center of the east wall and is at ground level. The other two are located at the center of the northern and southern walls about 1.06m above ground level. There are two windows in each of these walls and four in the east wall.

Two tabby foundation walls divide the east room into three equal parts. As evidenced by these foundations, sockets in the walls of the southern and northern areas of the room, and the height of the

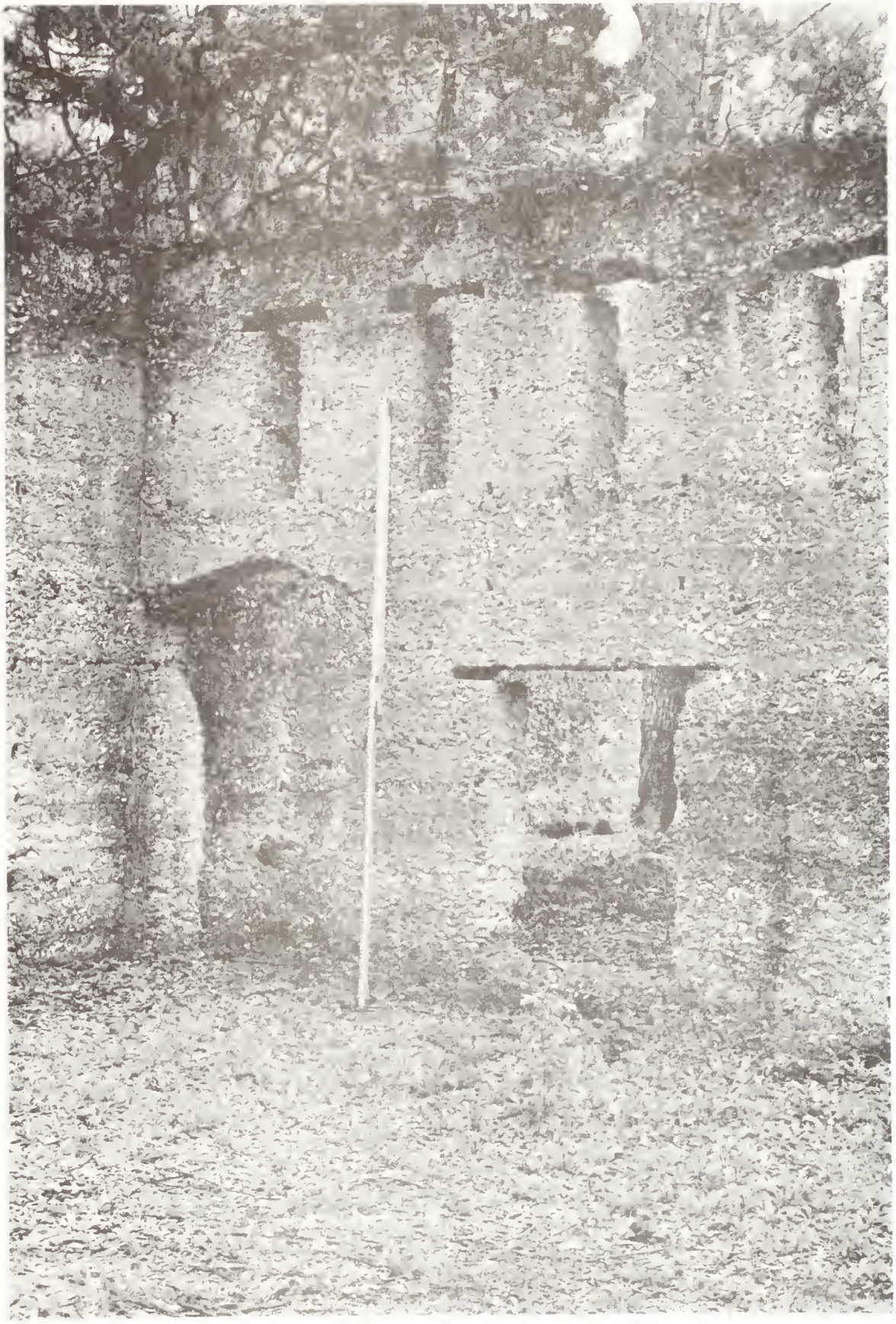


Figure 3. West Room, Exterior View to the South.

southern and northern doorways, it is apparent that these foundations were constructed to support wooden floors for these areas (Figure 4). The central area of the room has no sockets for joists, and therefore it is unlikely that it had a wooden floor. This is further confirmed by the relationship of the exterior door opening and the tabby foundation walls (Figure 5).

The north and south porches both have four tabby columns. They are 76cm wide and 3.04m high. The easternmost of these columns on the south porch has fallen over and a portion of it is not present at the site. These columns were most likely constructed to help support roof beams for the long span over the center section of the sugarhouse.

From observations of the construction patterns in the tabby walls it is possible to determine that the eastern and center rooms were built as a single unit. Tabby was poured in a continuous form for all of the walls in these rooms. The western room was constructed separately and was added to the other structure. Also the tabby foundation walls in the eastern room were constructed separately from the other walls in that room.

In addition to the walls of the sugarhouse structure and the two foundation walls in the east room, there are two retaining walls in the southeast corner of the north porch. Floyd suggests that these retaining walls were constructed as a water cistern (1937:157). He felt that such a cistern would be necessary to provide enough water to keep a large sugarhouse like this clean. Today these foundation walls

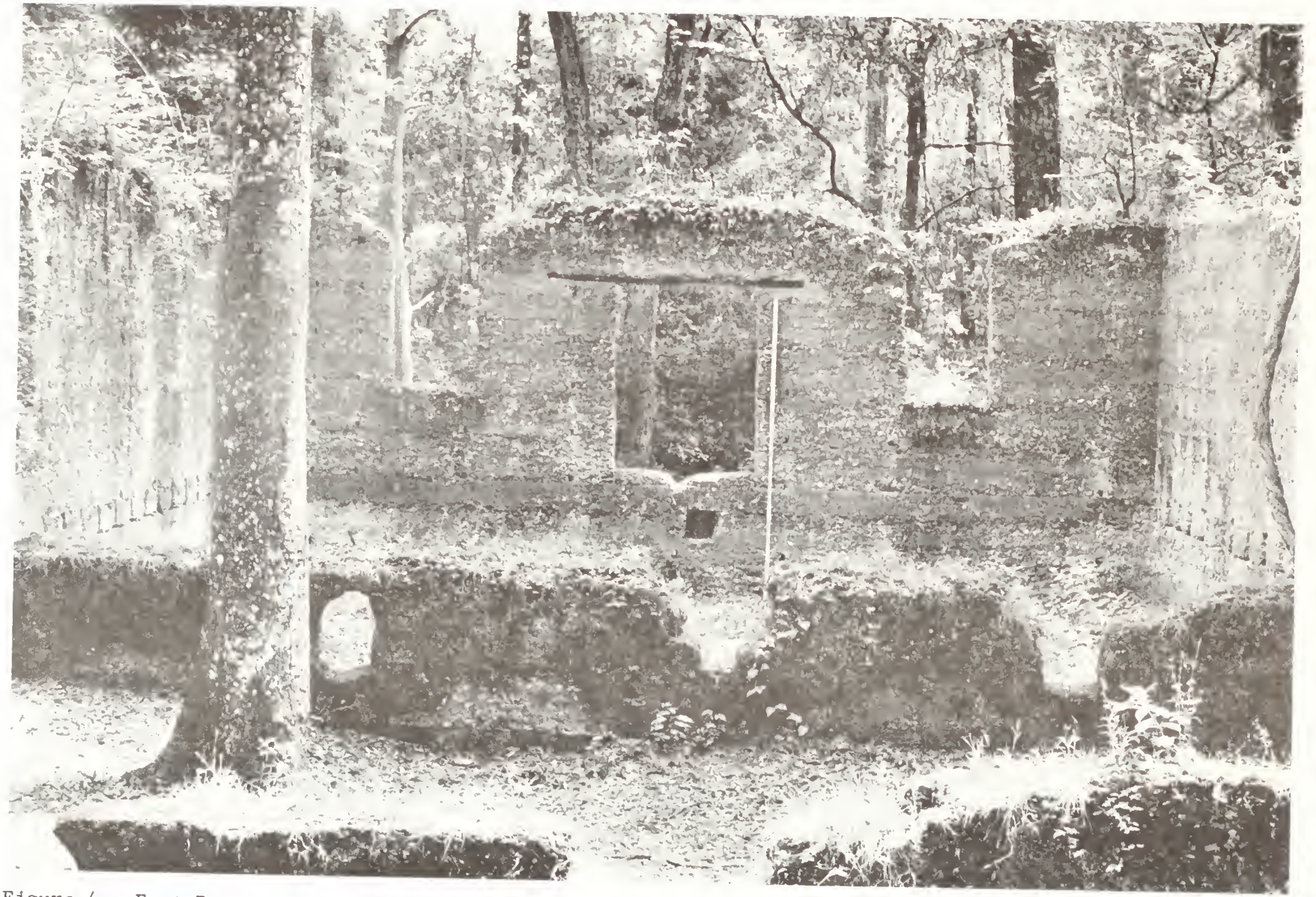


Figure 4. East Room, Interior View to the South. (Note: wall sockets for the wooden floor, and the two tabby foundation walls in the foreground.)

are considerably eroded on the upper surfaces due to natural processes and destruction caused by site visitors walking on the walls.

Two depressed areas exist outside of the sugarhouse. The first is near the northeast corner of the building. It is reported by Floyd (1937) and Ford as a well (1937). The other depression is near the south door of the west room. Other than these depressions and the sugarhouse ruins, there is little other surface evidence of architectural elements at the site. The one exception is found north of the west room. In that area, a number of brick fragments can be found scattered about.

Previous Research

Although a significant number of plantation period sites have been excavated in the Georgia coastal area, very few of these investigations have involved the archaeology of a sugarhouse. The first reported archaeological study of a sugarhouse site occurred in 1934 (Ford 1937: 193-213).

James Ford, working for the now reorganized Georgia State Parks Department, carried out a six week investigation of the tabby ruins of Elizafield Plantation on St. Simons Island, Glynn County, Georgia. These ruins were thought by some historians to be the site and remains of the Spanish mission Santa Domingo. Ford concluded the ruins were, in fact, the ruins of an octagonal sugar mill building and a rectangular sugar manufacturing building (1937: 202-203).

Figure 5. West Exterior Door.

While involved with the Elizafield Plantation archaeological project, Ford took the opportunity to visit other tabby ruins that had also been reported to be the remains of Spanish missions on the Georgia coast. He spent one day at the McIntosh ruins in Camden County and concluded that these ruins were not those of the mission Santa Maria. He felt they were the remains of a sugarhouse and explained the fact that this was a single structure rather than two separate structures as the result of change in the technology for sugar manufacturing (Ford 1937: 202). Ford recorded the ruins of the McIntosh Sugarhouse, but it is uncertain if he carried out any excavation at the site. His map indicates two excavation areas, but he makes no reference to them in his report. Ford also visited the tabby ruins at the Thickets Plantation near Darien in McIntosh County. There he recorded an octagonal mill building (Ford 1937: 201).

Morgan Crook and Patricia O'Grady, under the supervision of Lewis Larson, conducted test excavations at the octagonal mill building constructed by Thomas Spalding on Sapelo Island, McIntosh County, Georgia (Crook and O'Grady 1977: 318-350). Their work consisted of mapping the site and excavation of two exploratory test units. The results of these excavations were analyzed, and their findings compared with publications by Spalding regarding his involvement with sugar production. Crook and O'Grady also present an economic background for the production of sugar during the time that the Spalding sugarhouse was in operation, the first part of the nineteenth century.

Beyond current archaeological investigations at the McIntosh Sugarhouse and the work by Ford, Crook and O'Grady, there are no other accounts of professionally conducted excavations at sugarhouses in Georgia. Floyd does report that I.F. Arnow, digging at the McIntosh Sugarhouse, "Discovered... the base of a furnace...." (1937:159). This discovery apparently occured in 1904.

Other investigations of sugarhouses include a study of the Galways Plantation of Monserrat in the West Indies, a sugar mill in northern Belize, and what has been reported to be a sugar mill at the Mission San José y San Miguel de Aguayo, Texas. Of these studies, the work at Galways Plantation is the most useful for comparative analysis with the findings of the current investigation of the McIntosh Sugarhouse.

The report by Lydia Pulsipher and Conrad Goodwin of the Galways Plantation is the first phase of an extensive program to investigate the large mid-eighteenth century sugar plantation (Pulsipher and Goodwin 1982). Their first phase work included site mapping and making a controlled artifact collection. They located two mill buildings; the first was constructed for a cattle powered mill and the second for a wind powered mill. They also identified the sugar processing house, the great house (the Galway residence) and several other structures.

David Pendergast has reported encountering a sugar mill at Lananai, Belize (1981). Very little can be understood of the mill

complex from his newsletter report; however, a full report is in preparation and should provide a greater understanding of the site and the sugar industry in Belize. Pendergast does state "We thought that the level areas around the mid-19th century edifice were work surfaces without permanent construction, but digging revealed a great complex of brickwork channels, small tanks, and other features that are bewildering to a Mayanist" (1981: 1).

John Clark (1976: 245-260) carried out an archaeological investigation at the Mission San José y San Miguel in an attempt to locate a sugar mill that was reported for the mission. It is uncertain from the data presented in the report that the site investigated is an eighteenth century sugar mill. The test pit excavated by Clark and the 1934 excavation by Harvey Smith, Sr. (Clark 1976: 248) seem inconclusive for an argument that the limestone and lime mortar structure represents the remains of a sugar boiling operation. Given the likelihood that archaeological evidence exists, further investigation at the mission could prove most important to the understanding of early sugar works technology.

A description of an 1818 steam engine has been published by Cornelius Roosevelt (1976:23-28). The steam engine and associated sugar mill are located in Haiti. Roosevelt provides a detailed discussion of the engine and drive assemblies, but little is mentioned about the sugar mill and no site maps were included in the report. No comments are made regarding the archaeology likely to exist at the site.

These few investigations at sugarhouse sites constitute the extent of research conducted and reported in the archaeological literature. The ethnological and historical literature, on the other hand, have been most useful in defining what might be expected during an archaeological investigation of an eighteenth, nineteenth or twentieth century sugarhouse site. The findings from this body of literature will be combined and presented as a social history for sugar production in the Americas.

Research Goals and Objectives

As stated previously, the research goals for the McIntosh Sugarhouse archaeological project are to define the extent, nature, and significance of the archaeology present at the site and to prepare management and interpretive recommendations for site development. To accomplish these goals, research objectives were established. These objectives fall into three categories:

(1) a literature search that can be used to define a social history for sugar production in the Americas;

(2) extensive archaeological testing at the McIntosh Sugarhouse based on the conclusions reached by the social history; and,

(3) use the results of the archaeological testing in conjunction with the social

history to define the significance of the archaeology encountered and develop recommendations for conservation of the McIntosh Sugarhouse and archaeological area.

Each of these categories then has several operational objectives.

In order to develop a social history for sugar production in the Americas the literature search must explore several aspects of plantation society, agriculture, and industrial technology. The demography, technology, economy, and environment must be understood for each of the major regions in Latin America and the Southern United States that were competing for the world sugar market. In doing so, the relationships between infrastructural modes of production, structural components of domestic and political economy, and the superstructural values, goals, ideologies and philosophies must be determined for each area. Thus, the design of the literature search requires that the search define the makeup of the labor force, the manner that the labor force is maintained or expanded, the organization of labor, the economics of production and marketing, and any environmental changes or constraints affecting sugar production.

The literature search and resulting social history will make several major contributions to the archaeological research objectives of the McIntosh Sugarhouse project. They provide the basis for understanding how the sugarhouse fits into an evolving industrial enterprise. They also help to explain differences and similarities between the McIntosh Sugarhouse and others constructed during the first half of the nineteenth century and they assist in identifying

features at the site that are earlier or later than the sugar operation. Further, they are used to predict the areas at the site most likely to produce archaeological data relating to the sugar works.

This last contribution is perhaps the most important because it permits the archaeological testing to be directed to areas that confirm or deny certain historical assumptions about sugarhouse construction and operation. This maximizes the archaeological testing in those areas most likely to yield information that can be used to establish the significance of the site. To accomplish this, the social history must contain an activity model which predicts behavioral aspects of the sugar manufacturing process and the activities involved.

Specific objectives for the archaeological research are designed to understand the extent and nature of the archaeological component of the McIntosh Sugarhouse. The first of these objectives is to define the limits of the archaeological area associated with the site. This must be accomplished through traditional testing schemes and remote sensing. Results are intended to provide an analysis of the extent to which the archaeology at the site has been disturbed, the reliability of the archaeological data for interpreting the site, and the limits of the areas to be more fully investigated.

The second objective is to undertake extensive archaeological investigative efforts in those areas where the activity model and initial testing indicate the greatest likelihood for producing data that can be used to interpret the site. This is the most significant archaeological objective because it will provide the data necessary to

point out the differences and similarities between the McIntosh Sugarhouse, other sugarhouses that have been investigated archaeologically, and what the historical record indicates should constitute an early nineteenth century sugarhouse. It will also provide the majority of data necessary for interpretation of the site.

The final archaeological objective is to excavate selected areas that can provide information about the architectural parameters of the site. These excavations should develop data regarding roof overhang, tabby construction methods, and the stability of the ruins. Again, these data will be important for interpreting the site, as well as assisting in the development of management recommendations.

The final analysis of findings from the literature search and archaeological testing program will be accomplished from an informed perspective of what historians have recorded at existing sugar plantations, what archaeologists have found at other sugarhouse sites, and what exists archaeologically at the McIntosh Sugarhouse. This analysis will point out changes in sugar plantation society and the sugar manufacturing process through time and space and suggest why sugar plantations did not succeed in the Georgia study area.

CHAPTER II

SUGAR PRODUCTION IN THE AMERICAS

The introduction of sugar cane and sugar to the New World occurred in 1493. Columbus brought the cane to Hispañola on his second voyage (Steward, et al. 1956:37). Before this, however, Portugal had introduced sugar to its island colonies on Madeira and the Azores (Taylor 1978:13). A high demand for sugar in Europe led to the rapid establishment of sugar plantations in the Azores, Maderis, São Tome and the Cape Verde Islands; with this expansion Portugal controlled world sugar production at the beginning of the sixteenth century (Taylor 1978:13-14; Wolf 1982:110-120). The discovery of Brazil by the Portuguese explorer Pedro Alveres Cabral in 1500, opened a major new area where sugar plantations could be established. By 1550, sugar plantations extended from Recife to Salvador along the rich soils of the northeast coast of Brazil (Wagley 1971:25). The addition of Brazilian sugar plantations assured the Portuguese hold on world sugar production into the latter part of the eighteenth century.

Colonization of Brazil was slow to begin. After the discovery of Brazil few Portuguese nationals perceived a purpose in settling in the hostile new land. The first settlers found the Indians to be "animals, barbarians and buggers" (Wagley 1971:19). The Indian cultural practice of cannibalism also appalled them. Even with these reactions to the native population, traders did establish stations where goods were exchanged for Brazilwood. The Brazilwood was shipped to Portugal where a red dye was extracted from

the wood. Red dye was a prime commodity of the European market. Trade in Brazilwood dye never reached a level that could support the cost incurred by the Portuguese Crown in maintaining its claim to the vast lands of Brazil.

In order to expedite settlement in the colony Dom João III introduced a system of land grants or captaincies that permitted Portuguese nationals to acquire and control large tracts of land. The deeds to the lands could be inherited and entitled the holder to duty free trade with Portugal. Initial occupancy of the lands was not specified (Taylor 1978:17-18). After 1534, when the captaincies were granted, many Portuguese settlers came to Brazil and established sugar plantations. With the introduction of sugar, settlement occurred rapidly. This land policy of Dom João III had as its basis mercantilism, which in turn locked the Brazilian planters into primary production of sugar as an export crop (Taylor 1978:17; Wolf 1982: 111-112). On the other hand the land policy system that developed in the Spanish controlled West Indies resembled the earlier European feudal system of land tenancy.

The traditional semi-feudal farming pattern of the West Indies combined subsistence agriculture and cash cropping. The cash crops were primarily sold within the islands and not exported to Europe. These crops were generally rice and maize. Sugar cane was grown for use by the farm and island population (Steward et al. 1956:47).

Coffee was introduced to some of the islands of the West

Indies in about 1700. With the introduction of coffee a slow shift to production for export began. Sugar soon joined coffee in the eighteenth century as an export commodity (Steward et al. 1956:47). With the beginning of the nineteenth century the West Indies had taken full control of world sugar production.

The Portuguese-Brazilian hold on sugar production started a steady decline during the 1650s that left the door open for the West Indian planters to take control of the market (Taylor 1978:24; Wagley 1971:25). Perhaps the most important factor affecting this outcome was expulsion of Dutch and Jewish merchants from Brazil in 1654. The Dutch and Sephardic Jews were important in the Brazilian sugar industry because they had become the major slave traders and they were able to coordinate sugar production with market demand in Europe, keeping the price of Brazilian sugar high. The Dutch were encroachers in the Portuguese colony. They raided coastal towns and Portuguese ships laden with sugar. The Dutch established illegal settlements and took advantage of the Sephardic Jewish population (who had been deported to Brazil) to trade directly with the Brazilian planters (Taylor 1978:22). They established a colony in Pernambuco and held it for over twenty years. When the Dutch and Jewish merchants were finally removed, they took with them not only their knowledge of the successful Brazilian cane planting and milling practices, but their access to the major European sugar refineries and markets (Wagley 1971:25; Taylor 1978:21-22).

Many of these merchants settled in the West Indies and with

them came a ready market for sugar and the beginning of major sugar plantations of the islands. Through the Dutch and Jewish settlers new mechanisms of finance became available to the planters and, as such, the newest milling and processing technology could be imported. This period also brought a weakening influence from the Spanish Crown and the Church leaving the island planters more freedom to pursue their own development.

Sugar cane arrived in North America much later than it did in the Caribbean Islands and Brazil. Early records indicate that attempts to grow sugar in the southern United States most likely began in the Louisiana Territory during the early 1700s. By the end of the eighteenth century sugar had been demonstrated to be an economically successful crop and planters in other areas of the southern United States began to plant cane.

Three major areas of production developed. In Texas, sugar cane was planted along the Gulf Coast and in the valleys of the Brazos and Colorado Rivers. Louisiana continued to grow cane and by the end of the nineteenth century produced ninety percent of southern United States sugar (Sitterson 1953:13). The other major area of production included portions of southeastern Georgia and northern Florida. However, in Georgia and Florida, it was only produced on an intermittent basis and never as the single cash crop on a plantation.

The first report of sugar cane arriving in Georgia is said to have been in 1784 (Coulter 1940:113). Coulter writes that John McQueen brought his Georgian friends cane plants acquired in Jamaica.

The next documented report occurs in 1829. Thomas Spalding, of Sapelo Island, states that he began cultivation of 100 plants in 1805 (Spalding 1829:55).

The following discussion will be directed to technological and agricultural considerations of sugar production in the Americas. To understand development of sugar production at the John Houstoun McIntosh Sugarhouse site and surrounding area, the sugarhouse and its location will be compared to selected areas in Brazil, Cuba, and Louisiana. The discussion will concern the social and technological history of these areas. From this discussion an activity model will be constructed to direct and interpret the archaeology at the McIntosh Sugarhouse.

The Agriculture and Production Technology for Manufacturing Sugar

Between 1500 and 1850 little effort was made to intentionally hybridize specific varieties of sugar cane. As late as 1805, Thomas Spalding (1829:55), attempted to find plants that were hardy to the fall, winter, and spring frosts common to the Georgia coast and plants that had a high juice yield. He found the "common green or Otaheite" cane to have an inferior juice yield but could be processed effectively with the vertical three roller mill. "Ribbon" cane, introduced from Jamaica, was a hardy plant and had a high juice yield. To process ribbon cane efficiently required the use of a horizontal roller mill (Spalding 1832).

The requirements for planting sugar cane are relatively

simple (Spalding 1816; Stubbs 1897). First the field must be plowed. Lengths of seed cane are laid in continuous rows within a trench or furrowed ridge. Seed cane is a length of cane taken from the previous crop and protected from rotting and freezing. The seed cane is then covered with several inches of soil; the depth of planting varies where frost is a consideration. Rows vary in separation from two-and-a-half to seven feet. The new plants begin to sprout from the seed cane when proper moisture and temperature variables are reached. In tropical and semi-tropical areas, the rainy season is critical for new growth. In the southern United States it is temperature.

Beyond weeding, little attention to the cane field is necessary until harvest time. However, harvesting the sugar cane and processing it for the sugar mill is the most arduous task on the plantation. Thomas Spalding offers some observations on this plantation activity (1829:58-59). He suggests that 50 laborers are necessary to take the cane from 100 acres (40.5 hectares) during a two month period. The laborers must cut the cane, strip off the leaves, place it flat on carts, and haul it to the mill. There it is unloaded and prepared for the grinder. There are numerous reports of using railroads constructed with movable wooden rails and boats, such as rice boats, to move cane from the fields to the mills (Sitterson 1953:227; Sulliman 1830:227; and Floyd 1937:101).

The manufacture of sugar from the cane required three major steps. First, cane was crushed or ground in a mill to separate the

sweet juice from the rind. Second, the juice was clarified and boiled down to a thick syrup. The syrup was then placed in containers where it would crystallize. Any syrup remaining after crystallization occurred was drained off as molasses and sold in that form.

The first sugar mills were constructed of wood and had vertical rollers through which the cane would be forced. This basic design continued to be used into the nineteenth century. The first major change involved sheathing the rollers with iron, and by 1800 replacing them with solid iron rollers (Sitterson 1953:138). In the 1820s the design was radically altered. The vertical rollers were eliminated and replaced by horizontal rollers. This is important for several reasons; not only could more juice be extracted from the cane but a harder and tougher variety of cane could be processed. This hardy variety, ribbon cane, grew quickly, matured earlier, and was more resistant to drought and frost (Sitterson 1953:138).

The early sugar mill was generally placed at one end of a boiling and curing building. The first of these structures may have been little more than a shed over boiling kettle with the mill detached from the structure (Clark 1976:250-256). As the quality and quantity of sugar production increased, the boiling and curing operation was carried out inside a two room building with one room dedicated to boiling and the other to curing. The principal reason for enclosing the curing operation in a special room is related to an underlying assumption that curing the syrup required heat. This

assumption eventually led to the construction of stone, brick, and tabby sugarhouses. Such structures protected against the danger of fire from boiling the juice, as well as acting to maintain heat in the curing room. Thus, through time the sugarhouse developed from a simple shed to a two room building (Spalding 1829:60; Sitterson 1953:135-138).

As the size and value of vertical roller mills increased the mill was frequently housed in its own building. These first buildings were often octagonal or circular because such a structure could efficiently house the vertical roller mills and the animals that were employed to power the mill (see Crook and O'Grady 1977:322,325; Ford 1937:195). The drive mechanism on a vertical roller mill comes out the top of the mill and required the animals to walk around the mill (see Fraginals 1976:104). When horizontal roller mills were introduced, they were frequently housed in a third room of the boiling and curing building. By 1825, newly constructed sugarhouses were generally rectangular with the mill at one end, the boiling room in the center, and the curing at the other end. Use of horizontal roller mills eliminated the need for an octagonal or circular milling room because the mill's drive mechanisms came out the side of the mill and no longer required the animals to walk around the mill (see Fraginals 1976:102). Instead, the animals could be removed to one side of the mill.

Early wooden vertical roller mills were nearly always animal powered. They generally used oxen, mules, and horses to turn the

rollers. On hilly terrain or in tidal areas a few sugar mills are reported to have been water powered (Spalding 1832:282; Steward et al. 1956; Sitterson 1953; Fraginals 1976). Several reports of wind powered sugar mills have been found for the Americas, but these are few and far between (Fraginals 1976:35-36; Pulsipher and Goodwin 1982).

Animal powered mills frequently employed eight oxen to turn the rollers. The central vertical drive shaft would be affixed with a set of crossed wooden beams. Each end of the beams would then hold a double yoke. In this way, the oxen would walk around the mill as their power was transferred to the rollers. This type of arrangement required that the cane be fed between the oxen to reach the mill and that the crushed cane or bagasse along with the extracted juice be taken out the other side, again fitting them between the oxen. With the construction of the octagonal mill buildings, the feed paths for the cane, baggasse, and juice could be offset vertically from the tread followed by the oxen. This reduced the problem of getting the cane to and from the mill.

The shift to new horizontal roller mills eliminated much of this problem. The new mill design no longer required a vertical drive shaft. Changing direction from the horizontal drive shaft to vertically suspended ox yoke presented few mechanical problems. An iron gear system could easily remove the draft animals from the immediate area of the mill. With the horizontal roller mills of the 1820s there also arrived the use of steam power for the sugar planters

who could afford to purchase an engine. Steam powered horizontal roller mills were common through out the world sugar growing regions by 1850 (Sitterson 1953:150).

The boiling operation on the sugar plantations also went through significant changes from a single kettle to the system that was probably used by John Houstoun McIntosh. The first change was the addition of several kettles, each with their own furnace. Next, the kettles were arranged in such a way that a single furnace could be used to heat all of the kettles. In this arrangement the fire ditch or flue was called a train. The juice would be transferred from one kettle or pan to the next as it was concentrated. The first pan was the largest and each successive pan was smaller. This system provided the greatest area for evaporation in the first pan and the least areas in the last or strike pan. As best as can be determined from the records of train type evaporation and concentration, the strike pan was located nearest to the firebox of the furnace (Sitterson 1953; Fraginals 1976).

Train type technology quickly spread within the sugar growing areas and received various names. Jamaica train was the name to become most often identified with an arrangement of five successively smaller pans. The French sugar planters in the West Indies called such a train Equipage du Pere Labat with the specific pans called: grande, propre, flambeau, sirop, and battèrie (Fraginals 1976:108). Other areas had their own names for the boiling trains. Brazil, Cuba, Louisiana, and Georgia generally used the name Jamaica train and occasionally in Louisiana the term "fire-wall" was used to designate a

five pan train.

During the nineteenth century the trains were enlarged to seven and nine pans. Such expansion was generally associated with a shift from a sugarhouse on the plantation to a large centrally located sugar factory. These factories may have been owned by several planters or constructed by an independent entrepreneur (Sitterson 1953; Steward et al. 1956; Wagley 1971; Taylor 1978; Fraginals 1976).

The Brazilian Sugar Plantation

Like the sugar plantations in Cuba, Louisiana, and Georgia the plantations of Brazil were established through the labor of slaves. At first, the Brazilian planters enslaved the Indian population but this did not prove successful. Many of the Indians quickly died from smallpox, measles, and various other infections and viruses (Wagley 1971:18). Additionally, the Indians who escaped enslavement could go to their yet uncaptured kinsmen for shelter. When the planter turned to Africa as the primary source for slaves, those who survived the voyage to Brazil had no place to escape. They were as alien off the plantation as they were on it.

Because Portugal controlled the major slave trading stations on the west coast of Africa, it was relatively easy for the Brazilian planters to import the Black slaves. Taylor (1978:22) states that in 1570 there were at least sixty sugar mills operating in Brazil with a free population of 17,000 and a slave population of 13,000. By 1798, when the first Brazilian census was taken, a population of 2,998,000

non-Indians was reported with 50 per cent of that group comprised of slaves (Taylor 1978:42). It is difficult to know the number of slaves in Brazil at the time of abolition, 1888, because Rui Barbosa had all official records of slavery destroyed. This was accomplished to free black Brazilians from any stigma associated with past slavery (Wagley 1971:19).

The ethnological study of Vila Reconcavo, by Harry W. Hutchinson (1957), provides important insights for understanding the Brazilian sugar plantation as it existed during slavery and as it has changed since abolition. Hutchinson has described a privately owned and operated sugar plantation that he observed in 1950 and 1951. The plantation is in the state of Bahia, on the Bay of All Saints, approximately 40 kilometers from Salvador. At the time of Hutchinson's study, the plantation no longer manufactured its own sugar. Instead, it sold its cane to the nearby corporately owned factory (usina). Aside from the absence of a sugarhouse on the plantation, it appears much as it would have during the great Brazilian sugar boom.

The Fazenda das Mocas (Ethnographic present) is operated by Dona Sinhá, the owner of the plantation. She has been actively engaged in the operation of the fazenda since the death of her husband. She spends most of the year on the plantation and lives in the city only two months, during the rainy season.

Seu Paulo is overseer at the fazenda and has nearly equal

managerial responsibilities with Dona Sinhá. Two other employees have status above the workers. They are the feitor (foreman) and the vaqueiro (cowboy). The feitor has the responsibility to record how much work is accomplished and by whom. The payroll of the fazenda is derived from these records. The vaqueiro takes care of the cattle, milk cows, and saddle horses. He is also required to accompany Dona Sinhá and her family on pleasure rides, to meet the train or boat, and to get mail from the post office.

The name engenho has been used from the time of the early sugar plantations to denote the animal-driven mill and the rest of the plantation. The engenho consisted of the sugar mill, boiling and curing house, the casa grande (the plantation owner's house), a chapel, a house for the overseer, the house of the foreman, the house of the workers, buildings for equipment, and the casa de farinha (for producing manioc flour). Forests were maintained for firewood (used initially in the boiling operation, and later to power steam engines at the mill). Cane fields occupied the majority of land on the plantation, with some lands kept in pasture for the animals and a much smaller area reserved for subsistence agriculture. Traditionally, some lands may have been rented to freemen who owned slaves and grew cane that would be sold to the plantation.

The physical plan of the Fazenda das Mocas reflects almost exactly the traditional arrangement of buildings in an engenho. The primary exception, as mentioned earlier, is the absence of the sugar

mill and boiling/curing building. The casa grande stands on a hill overlooking the plantation; nearby is the worker settlement. This settlement consists of a narrow street with worker housing on each side. Also on the street is the house of the overseer and the casa de farinha (the location of manioc flour production, the flour an essential element in the worker diet). Buildings to house the plantation equipment (plows, a tractor, a jeep, carts, etc.) are located on the street, away from the casa grande. A school has been constructed on the plantation and is used for children's classes during the day and adult classes at night. When a priest from the monastery in the city comes to the engenho, the school is used to hold mass.

Hutchinson reports that the population of the engenho in the early 1950s was over 200, with an actual work force of between 60 and 70 men and boys. Additionally, several women were employed for light work and domestic service.

The focal points for administration and social activities on the fazenda are the casa grande and the overseer's house. Dona Sinhá provides medical attention from her residence. She also carries out personnel administration and arbitration from her home, maintains supplies such as oil for the tractor, has the only telephone on the plantation, and takes care of all other business that falls to the owner. The workers see her not only as the boss, but as their patrao.

Seu Paulo, the overseer, also uses his house for administra-

tive activities. Perhaps more importantly, his house has become the location for much of the social activity in the worker community. Recently, electricity had been installed in his house. Thus the house, larger than those of the workers and with a veranda, has come to be a gathering place in the early evening. Seu Paulo's new radio also draws considerable attention and dancing on the veranda.

As Wagley has pointed out, the plantation village is closely knit (1971:154). Residents are frequently kinsmen, related directly or through godparentship. Men work together in the subsistence gardens and house repair, while the women share in the task of making manioc flour. The plantation owner and the overseer participate in neighborhood life.

It seems justifiable to say that Hutchinson's study of the community Vila Reconcavo provides not only a perspective on a sugar plantation during the 1950s, but insight regarding the life ways of plantation culture during the eighteenth and nineteenth centuries in Brazil. Although his study was done sixty years after abolition, the social structure of the plantation had changed little since the days of slavery. While the plantation workers had the freedom to leave the plantation, there has been only a small change in the makeup of the worker village.

The Cuban Sugar Boom

Even though the West Indies were late to enter large scale

sugar production, they became the world leaders during the eighteenth and nineteenth centuries. Because the islands were controlled by different European nations, with different colonial policy, their development as sugar colonies varied with respect to the mother country. Manuel Fraginals (1976) provides an excellent account of the social and economic development of sugar in Cuba. His research shall serve as the basis for understanding the social history of sugar production that followed the sugar boom in Brazil.

By 1792, all barriers to sugar production in Cuba had been removed, and the island (114,524.62 sq. km.) had become the world production leader. In 1759, there were 89 sugar mills operating in the Havana area; in 1760 the number increased to 93, in 1761 to 98, and in 1764 the number of mills was 106 (Fraginals 1976:25). However, this kind of expansion was not achieved without cost to the Cuban semi-feudal oligarchy.

The beginnings of the sugar boom started with an effort to intensify export production. As stated previously, coffee was introduced to the islands of the West Indies in 1700 and with it a trend to export agricultural products to Europe. In Cuba, planters, or hacendados as they are called, had been exporting tobacco and selling rice and maize to the local communities. To shift production and move to sugar monoculture, investments were made in preparing fields, constructing sugarhouses, and purchasing slaves and equipment.

Merchants licensed by Spain sold slaves to the hacendados and

provided access to commodities not available on the island. They also purchased sugar from the plantations and shipped it to European and North American markets. As the Cuban planters and merchants gained control of the world sugar market they became quite wealthy yet Cuba gained little from Spanish colonial policy. What the colony then required was a government with a legal system that could provide a friendly environment for capitalist growth and industrial development.

Differences between the Spanish Crown and the Cuban hacendados developed with respect to colonial land policies and attempts by the Crown to control the export economy. The Crown had received significant income from the export of Cuban tobacco. It began to protect the rights of tobacco growers over the interests of other producers. Sugar was viewed as a threat to high tobacco profits. The Crown attempted to control the expansion of sugar growing by protecting "natural tobacco lands" from infringement (Fraginals 1976: 20-25).

In 1701, the Crown began efforts to control tobacco interests on the island. First, the Crown appointed royal commissioners to purchase tobacco from the hacendados. Then, in 1711, it established the Factoria to process Cuban tobacco. Next, the Factoria was authorized to contract directly with the hacendados for their tabacco. By 1760, the Real Factoria had been given the exclusive right to purchase Cuban tobacco (Fraginals 1976:20-25). The Crown also took action to protect "natural tobacco lands" from infringement.

The Factoria closed economic expansion for the Cuban oligarchy. Tobacco was quickly seen as a dead end investment for the hacendados and sugar was perceived as the way to new economic success. It took the Crown years to understand and reconcile this, and so, was slow to aid the hacendados in their efforts toward sugar production.

When the sugar boom got into full swing by the mid-eighteenth century, most of the tobacco planters converted to sugar production or were forced from their lands. The sugar plantations enlarged quickly, adding fields for their cane and pasture for their animals. Forests were acquired to supply wood for construction of sugarhouses, other buildings, carts and to feed the boiling kettles. Within a few years most of Cuba's forest lands had been cut.

The more land the plantations consumed, the more difficult logistics on the island became. As the range of the plantations extended away from the plantation village there came a need to move the sugar mills, or trapiches, to the cane fields. With the trapiche went the field labor. No longer could the hacendado keep field slaves under supervision at the plantation village. Instead, field workers were separated from their families and housed in the fields. This resulted in a general reduction in the standard of living for plantation slaves.

In the traditional Spanish semi-feudal organization the Church provided for the spiritual needs of the plantation, including holding masses, baptisms, marriages, funerals, blessing crops and

dedicating buildings. In exchange for these services, the hacendado maintained a chapel and priest at the plantation village and paid taxes to the Church. In this relationship, the Church could exert pressure on the hacendado to protect and care for plantation slaves.

Even though the Church had long concerned itself with the question of slavery, the presumed need for forced labor in the expanding world economy was not an issue with which the Church could deal. Alternately, the Church argued that offering the African slave salvation through Christianity was the course to take. In this way slave trade was presented as a missionary effort (Fraginals 1976:53).

In time hacendados began to suggest that it was impractical to take 200 or more slaves away from their work and bring them to the plantation chapel for Sunday mass. After a time, the hacendado convinced the Church to reduce their demands for compulsory attendance at mass each Sunday to a few important Saints-Days and finally to remove all attendance requirements. Not only did this mean that the slaves had no free days to attend church, but it eliminated free time that had been available for subsistence agriculture, trapping, and gathering. This also put the burden of slave subsistence squarely on the hacendado.

Once the Church lost its influence over the slave population, their welfare became the exclusive jurisdiction of the hacendado. To the extent that slaves could be replaced more inexpensively than they could be maintained, their treatment became unimportant. The British slave traders offered the hacendado a new source of inexpensive slaves

and closed the door on need for slave maintenance. The eleven month period of British occupation, in 1762-63, saw more slaves imported to the island than had been imported in the previous twelve to fifteen years (Fraginals 1976:17).

The expansive growth of Cuban sugar production continued into the nineteenth century, but with setbacks. Large fluctuation in the price of sugar, coupled with high inflation and exorbitant interest rates charged by unregulated financial institutions, resulted in bankruptcies, foreclosures, and a worsened life for slaves. It should be noted that the makings of the Cuban sugar boom was at first solely dependent on increasing the number of trapiches and slaves. After 1800 new technology made it possible to produce more sugar more efficiently.

Free commerce became legal after 1818 and the Spanish Crown's monopoly on tobacco was abolished. This attracted an interest in the island by merchants from Europe and North America. In the 1850s there were efforts by the United States to acquire the island. Pro-slavery lobbyists saw Cuba as a base for expanding slave territory. Even so, Spain, for the most part, managed to control the island until 1899. Slavery was officially abolished in 1878 and completely eliminated in 1886.

Even before abolition was in place the labor force on the sugar plantation had changed significantly. The new technology that brought more efficient sugar making also brought the need for skilled

labor. Also, as anti-slavery sentiment increased in the world, slaves became more difficult to obtain and more expensive to keep. A mixture of slave labor, hired slave, wage-workers, and free artisans were found on the plantation (Fraginals 1976:131-135).

The Georgia Experience With Sugar

At the close of the eighteenth century, the plantation system in Georgia was experiencing financial difficulties related to several factors. Although the plantations had not depended exclusively on monoculture, cotton had lowered soil fertility and crop yield was reduced. Those plantations located in river valleys and along the coastal estuaries could depend on rice to offset this reduction, but the rice market was unstable and therefore undependable.

At the recommendations of Thomas Spalding during the first decades of the nineteenth century, many Georgia planters turned to sugar cane to increase their revenues (Spalding 1829:55). He reported that in 1814, he received $12,500 for his sugar crop (Spalding 1829: 55). This accompanied the end of the War of 1812 which had brought non-importation and embargo acts and led other planters to begin cultivation of sugar cane. The well established plantations had the resources to construct sugarhouses for the exclusive use of the plantation where they were located. Some of the new mills were animal powered, a few were water powered and others took full advantage of steam power. Different types of mill rollers and drive mechanisms were selected by the planters to meet their specific levels of intended production and starting capital.

The result of these different approaches to sugar production resulted in different forms for sugarhouses. What has been reported to be Spalding's first sugarhouse has the form which one would expect to find in Brazil, Cuba, and Louisiana toward the end of the eighteenth century. There was an octagonal structure (now in ruins) which housed a vertical roller mill. Next to it stood a rectangular boiling and curing building (Spalding 1829:60; Floyd 1937:99-100; Crook and O'Grady 1977). The mill buildings at The Thickets, near Darien, and on Elizafield plantation, St. Simons Island, were also of this type (Ford 1937:194-204).

Major Jacob Wood, at Darien, altered this form slightly (Silliman 1830:227-229). His mill building was a square, two-story building. A vertical roller mill was located on the second floor and the animals used to power the mill were on the first floor. To overcome the burden of getting the cane to the second floor mill he designed a rather unique apparatus. Major Wood used rice boats to haul cane to his mill. Still in river water, the boats would be positioned over a submerged cart. The cart sat at the end of a ramp which led directly to the door of the mill room and had iron wheels, two large ones and two small ones, to keep it level as it moved up and down the ramp. The cart, boat and its load of cane would be pulled up to the mill with a horsepowered winch. Once there, the boat would be unloaded and returned to the river.

The mill installed by John Houstoun McIntosh at New Canaan

plantation was not a vertical roller mill but a horizontal one purchased from the West Point Foundry , N.Y. Spalding (1832:281) reports that it was the first of its kind to be operated in Georgia. He also states that it was animal powered. Floyd (1937:147-148) fixes the date of installation between 1826 and 1827. McIntosh did not put his mill in its own building, but located it in a third room at his sugarhouse. This room is the only two story room in the sugarhouse, leading to the conclusion that the mill was placed on one level while the animals used to power the mill were located on the other. Floyd (1937:151-154) proposes a reconstruction of the room with the mill at ground level and the animals offset from, but above the mill.

Spalding reports disappointment with the arrangement of the power system at the McIntosh sugarhouse. He states that he spent two years designing and constructing a water powered mill (Spalding 1832: 281-284). To operate the mill he excavated a two hectare (5 acre) mill pond, 30 cm. (12") deep. Tidal flooding, twice daily, kept the pond full but limited the time the mill could be operated to 10 - 12 hours out of every twenty-four. When the mill operated with a 7.31 m. (24') water wheel the power generated was equivalent to that provided by a 10-horsepower engine. It is uncertain from Spalding's report if the water mill was ever operated successfully. He mentions having difficulty with the wooden mechanisms he constructed. He also cites a letter of his describing the specifications for an iron mill that he

would like to have made for use with water power. Spalding does not report purchasing the mill or solving the problems with his wooden one. Still, though, he urges planters (who have the option) to select water power over steam power.

William Butler had begun operating a steam powered sugar mill at his plantation, near Darien, in 1829 (Butler 1829). John Hamilton Couper also installed a steam powered mill at his plantation on St. Simons Island. The Couper mill began work in 1830 and is reported by Floyd (1937:103) to have been the largest and last steam driven sugar works built in Georgia before the Civil War. Butler (1829) places the cost of the Couper engine and mill at $14,930.72. The 18-horsepower engine had been purchased from Boulton and Watt in England and used to process both rice and sugar (Floyd 1937:103).

Investing in steam powered mills was a significant undertaking for planters just starting in the sugar business. Many probably looked to modifications of the older types of mills for the principal answer to their needs. Those who did invest in steam engines could only expect a small return during their first years of sugar making.

Butler (1829) received an estimate of $5,840.60 from the West Point Foundry for a mill and 14-horsepower engine. Spalding (1829:60-61) cites English prices as 500, 650, and 800 pounds for four, six, and eight horsepower engines, respectively. He points out that a 25 per cent import tax on the British-made engines would be added to the

price of the engine. Spalding also gives the figure for an 8-horsepower West Point engine as $4,000. Sitterson (1953:138) mentions the price of steam engines and mills dropped between 1822 and 1831.

In addition to experimenting with different mills and power systems, the Georgia planters attempted to improve the boiling and curing operation at their sugarhouses. In the article that discusses Spalding's efforts with his waterpowered mill, he speaks of two years of alterations to his boiling apparatus with the hope of "...simplifying, improving, and cheapening this part of the process" (Spalding 1832:284). He reports only disappointment and a desire to continue the experiments.

McIntosh patented a method to precipitate out many of the impurities found in the cane juice (Spalding 1829:63; it was not possible to obtain a copy of this patent). Another development in the clarification process produced greater syrup yield from the cane juice and a better quality of sugar. This process involved boiling the juice in a vacuum apparatus, rather than open kettles. By 1864, the process was in wide use in Louisiana and reduced fuel need by 53 per cent (Sitterson 1953:150). Although there are no reports of the vacuum process for Georgia, it is likely that it had been adopted by some planters.

Most of the sugarhouses in the interior of Georgia were built of wood. On the coast, where aboriginal shell middens were available

to make tabby, it was more often used. Tabby construction had been introduced to Georgia in the early days of the colony. The practice of building with tabby had all but disappeared until revived by Spalding in the nineteenth century. His method has been described many times in the literature of the Georgia coast and will not be discussed here (see Coulter 1937).

Slavery in Georgia during the nineteenth century was markedly different from that in Cuba at the same time. It more closely resembled Brazilian slavery except slaves in Georgia could not purchase their freedom (Wagley 1971; Flanders 1933). The most important distinction between the three forms of slavery can be attributed to what has been called the task system (Flanders 1933). In this system tasks are assigned to slaves dependent on plantation needs and individual abilities. When a slave completed the assigned task, any remaining time could be devoted to personal activites. Subsistence gardening and hunting were accomplished during this free time (Otto 1975; Moore 1981).

The welfare of their slaves was a prime concern to Georgia planters. Before the founding of the United States, anti-slavery forces were acting to prohibit importation of slaves to the colonies. Georgia restricted the importation of slaves in 1793 and eliminated it in 1798. Unable to obtain slaves from beyond their own borders, the Georgia planters had no choice but to insure the health and reproductive success of their slaves. This concern can be seen from

the following comments by Thomas Spalding (1829:59):

> Where the culture is confined to two acres the hand, with some accompanying crop, the negroes unquestionably prefer it to any other culture in our country: They appear to me, as far as I can judge from my own, to enjoy more health, and to multiply faster than they did before I introduced sugar among them, and this reasonable, for every man, woman, and child upon the plantation, is feeding upon the sweets of the cane for three months of the year. . . . All apprehensions arising from injury to out Slaves, from adoption of this culture should cease.

His apprehensions stem in part from his experience while visiting in Louisiana in 1825(Spalding 1829:59).

> . . . still I conceive the negroes in Louisiana are too severely worked, there are too many men upon their plantations, and as far as I saw, they were declining in numbers, and sinking in strength, but this arose in great measure from the necessities of the Planter, who is active and energetic, and in general no more spares himself than he does his slave. It was certainly not because Sugar Cane was the crop, but because the planter had, perhaps in the beginning been mistaken in his means, and was making many efforts to relieve himself.

It should be noted that at the time Spalding visited Louisiana most plantations there had turned to sugar monoculture. Spain controlled the territory and many of the problems faced by the Cuban sugar growers were common to Louisiana.

The sugarhouse on the Georgia plantation was not always located

in the big house village. More frequently, the sugarhouse would be located near the cane fields with traditional crops of cotton and rice surrounding the big house. It is unlikely that the planter would construct a slave settlement at the sugarhouse because it was used only a few months of the year. It would be more likely that any additional villages would be located so they could serve several fields and not just those near the sugarhouse.

The selection of an area to grow cane was dependent on one major factor, the soil had to be well drained to prevent the shallow root system from rotting. Some planters used their fertile river lands while others, like Couper and McIntosh, preferred inland swamps that could be kept dry (Couper 1829:104). Deep plowing before planting was also undertaken to keep the roots from compacting the soil (Sitterson 1953:114). Crop rotation was also used to protect the soil. Cotton and potatoes were rotated with cane because they have deep roots and keep the soil broken up (Spalding 1828:553). Generally planting occurred any time between October and mid-March (Sitterson 1953; Spalding 1828; Stubbs 1897). This long planting season must have been particularly valuable to Georgia planters who added cane to their other crops. Planting activities could be scheduled around other activities on the plantations. Crook and O'Grady (1977) discuss the advantages of this ability to schedule planting activities in detail. Harvesting the cane occurred in November and December. While frost was a factor to be considered, after some experience it was determined that moderate frosts could be

tolerated (Spalding 1828:553).

Little information is available concerning sugar production in Georgia after 1830. The spring of 1829 brought a very wet March and a cold April, followed in 1830 by a dry summer and fall (Couper 1953:33). These two bad years for the cane crops and a fluctuating sugar market may have discouraged further efforts and investments to improve sugar production. It is certain that sugar continued to be grown on the Georgia plantations but never took on the importance it had during the first 30 years of the nineteenth century.

The Activity Model

To understand the significance of an archaeological site, the site must be seen in relationship to the culture that created it. For the John Houstoun McIntosh Sugarhouse, the significance of the site can be determined through an analysis of the demography of the New Canaan Plantation, the technology available to and employed by McIntosh, the plantation economy, and any environmental factors that encouraged or inhibited the successful growing of sugar cane on the plantation. From such an analysis, a behavioral activity model can be developed that sets archaeological research parameters, field methods, and serves to interpret the results of the field investigation.

The activity model proposed for the McIntosh sugarhouse relies primarily on the social history for sugar production already presented. It is also based on observations at the site before excavation and the few records that relate directly to McIntosh and his plantation. Even

though the records about McIntosh are often second-hand, they are still insightful.

Marmaduke Floyd (1937:142-160) compiled a short history for the ruins of the McIntosh sugarhouse. In that report he provides some data that can be used to understand why McIntosh moved to Georgia, what his intentions for his Georgia plantation were, and his success in accomplishing those intentions before his death. Beyond a few records at the Camden County Courthouse little else can be found that is important to this research.

Floyd tells us that McIntosh came to Georgia after the War of 1812. Before then he had lived in Spanish Florida. During the war, McIntosh was appointed governor of the province by individuals who wished to establish Florida an independent republic. McIntosh and his followers in northeast Florida supported the United States in the war and became a threat to continued Spanish rule. The unsuccessful campaign ended with the war and McIntosh moved to Camden County, Georgia. Floyd (1937:143) quotes a letter to the Collector of the Port of St. Marys, in which McIntosh says he is ". . . a man [McIntosh] . . . who has lost a very large possession [his lands in Florida], and now [is] almost ruined from his attachment to that Government."

McIntosh established a permanent residence at Marianna Plantation near the mouth of the St. Mary's River between the spring of 1812 and the fall of 1813; the actual date is unknown. In 1819, he purchased two smaller plantations adjacent to Marianna and renamed his holdings New Canaan. Floyd (1937:144-145) suggests this name came

from his intention to plant sugar cane on these new lands, particularly at the area of Dark Entry Swamp where the sugarhouse is located. Camden County deed records (Deed Book K/185,186) show an entry, dated 3 May 1819, in which McIntosh purchased 660 acres (267 hectares) of land at Dark Entry Swamp for $330.00. This land was part of the original 1787 state land grant to James Seagrove, although it had changed hands at least two times (1809 and 1817) before the McIntosh acquisition.

Even using all of the known records it is not possible to establish the exact construction dates or years of operation for the sugarhouse. Because it is located on the Dark Entry property it must have been after 1819. Spalding (1832:36) states that after returning from Louisiana in 1825 he recommended a sugar mill design to McIntosh, which he had constructed by the West Point Foundry. Couper built his sugarhouse in 1829, and it is apparent from his description of the construction (1831), and from various statements by Spalding (1829, 1832), that the McIntosh sugarhouse had already begun operation. It would seem reasonable to assume, as did Floyd, that the McIntosh sugarhouse was built in 1826 or 1827. This would have provided sufficient time for McIntosh to have developed the clarification process for which he reportedly received a patent in 1829 (Spalding 1829:62).

McIntosh died in 1836 at age 65. County deed records (Deed Book N/229, 300) show the sugarhouse property sold to Caroline M. S. Hallowes in 1840. The sale was recorded in the name of John Houstoun

McIntosh, son of the deceased McIntosh. Floyd's research confirms this sale (1937:149).

During the Hallowes tenure on the land the name of the plantation was changed to Bollingbrook. Colonel Hallowes planted cane and continued to use the sugarhouse. During the Civil War, Hallowes is also reported to have used the sugarhouse to process arrowroot starch (Floyd 1937:149). Caroline Hallowes (widowed) sold Bollingbrook in 1891 (Camden County Deed Book U/424-427). No record exists for the use of the sugarhouse after the Civil War. Floyd does state (1937:160) that a Mr. James Dancy and a Mr. Harry Russell remembered sugar making at Bollingbrook.

The 1830 Census of Georgia (U.S. Bureau of the Censes 1830: 186) indicates that McIntosh owned 6.5 per cent of the slaves recorded for Camden County. These 214 slaves were divided into the following groups: 28-m (m=Male) and 28-f (f=Female), under 10 yrs. (yrs.=years old); 16-m and 22-f, 10-24 yrs.; 16-m and 14-f, 24-36 yrs.; 15-m and 47-f, 36-55 yrs.; and, 19-m and 9-f, 55-100 yrs. There are three free whites reported: 1-m, 50-60 yrs.; 1-f, 50-60 yrs.; and 1-f 20-30 yrs. Tax records (1836 Tax Book A/241-252) at the time of McIntosh's death record 205 slaves valued at $8,272. Unfortunately, no other information regarding the McIntosh estate could be found from these records.

From the social history and the information gathered about John Houstoun McIntosh during his days in Georgia (1825+/- to 1836) it is possible to construct the activity model. As the name, activity model, suggests the organization of the model will be to identify

locations where different kinds of activity could be expected to occur. To do this New Canaan Plantation will be examined at three levels of socio-cultural organization: infrastructure, structure, and superstructure. Because there are no people living who can tell us what happened at New Canaan Plantation, we must rely on etic-behavioral observation to explain what will be found from the archaeological investigation at the site. The only source of emic-mental data comes from the letters and comments of Thomas Spalding, James Hamilton Couper, and a short excerpt from the diary of John Houstoun McIntosh.

Infrastructure

The modes of production and reproduction comprise the areas of concern at the infrastructural level. The McIntosh sugarhouse is located on New Canaan Plantation. A plantation, as defined by Eric Wolf (1982:315-318), is a large capital-consuming farm that uses a large labor force to produce a single crop or several crops for sale. The labor force works in gangs or at specified tasks. A foreman supervises the laborers in order to insure proper performance of duties, as determined by the plantation owner or manager. Large scale crop production requires that any processing of the crop occur on the plantation. Also, administration, processing and housing tend to form a single center on the plantation, the plantation village, big house village, plantation community, etc. When the plantation is established in an inhabited area, it appears as an island on a previously disturbed countryside; when it is founded on the edge of a

previously settled area, it is said to be on an expanding frontier. They are in fact enclaves or outposts dedicated to specialized production.

The labor force on a plantation may be comprised of wage-laborers, slaves, or both. During the seventeenth, eighteenth, and nineteenth centuries plantations using slave labor were established primarily in the Americas, on islands off western Africa, and on islands in the Indian Ocean. The planters acquired African slaves to work the fields and process the crops. By the beginning of the nineteenth century, plantations employing slave labor had become primary instruments of capitalist expansion into the world economy.

In the case of New Canaan Plantation, the 1830 census indicates that slaves comprised the entire labor force living on the plantation. Slightly over two hundred in number, they were probably housed near the big house where they could be managed. Because the census indicates no other freemen on the plantation except McIntosh, his wife and one other woman (perhaps his daughter), it is unlikely that slave communities were spread over the plantation.

A statistical analysis of the slave population indicates that approximately 52% of the individuals were under age 32. The number 32 is important because it is the same number of years since the prohibition on importing slaves to Georgia, as well as, the mean age of the slave population. Even if McIntosh had brought his slaves from Florida (as is likely), the data suggest that the slave population was stable. In fact, the data suggest the population might be growing;

approximately 26% were under 10 years old, 17% between 10 and 24, 14% between 24 and 36, 28% between 36 and 55, and 13% were between 55 and 100 years old. Unfortunately, these data can not be compared to the 1820 census because McIntosh did not reside in Georgia. Furthermore, the estate tax report did not divide the 205 slaves into age groups and it is impossible to assign the missing nine individuals, or for that matter, to know if the 1830 and 1836 populations were comprised of the same individuals.

We know from Spalding's comments (1829:59) and the work by Flanders (1933) that the work pattern on New Canaan Plantation was most likely the task system. Therefore, the slaves were providing at least a portion of their subsistence through gardening and hunting. Because the gardening activity was probably not supervised, it is probable that the gardens were located near the slave settlement. This would prevent the slaves from wandering far from their cabins in the late afternoon or after dark. Also, the plantation big house was on the St. Mary's River where estuarine food resources could be easily exploited. The sugarhouse was at least four miles from the nearest flowing water.

The technology of sugar production would certainly demand the assignment of specific activity areas. Beyond the activity in the fields, various tasks must be undertaken outside the sugarhouse. When the cane arrrived at the mill it had to be unloaded and stacked until it could be processed by the mill. Once the cane had been run through the mill, a disposal area for the baggasse was necessary. Another area

was required for storing and handling fuel to be used in the boiling room. By 1825, fire wood was supplemented with dried baggasse. A corral would be required for mill and cart animals, along with an area for storing feed. It could be expected that some free time would be spent near the well, along shady sides of the building or under trees on warm days and near the furnace on cold days.

Inside the sugar house space would be allocated for each of the tasks involved in sugar making, milling, animal care, clarification of the juice, boiling the syrup, and curing and storing the finished product. In addition to any architectural constraints on these activities, the particular skills of the workers, and status derived from those skills, would be reflected by the conditions in the activity areas.

Structure

The structural organization of the plantation includes domestic economy and political organization. Under these categories the activity model is concerned with family structure, domestic division of labor, domestic socialization, enculturation, education, age and sex roles, domestic discipline, taxation, tribute, class hierarchies, police control, and war. Unfortunately industrial archaeology can provide little to the understanding of this level of social organization. What it can do is provide data that can imply aspects of structure. For example, archaeology can be used to locate items that indicate age (toys), sex of the workers at the site

(articles of clothing), status of the workers (white clay tobacco pipes versus cobb pipes), armament (gun parts and flints), etc. Most of the archaeological clues to structure will be found at residential sites. However, because these kinds of evidence may exist at the sugarhouse, they must be included in the study. Therefore, these aspects of social organization are included in the activity model.

Superstructure

Superstructure is even more difficult, if not impossible, to reconstruct through archaeology. This level of cultural organization includes such behavioral activities as belief systems, art, music, dance, literature, symbols, myths, aesthetic standards and philosophies, and science. Because sugar production and technology, at the time of the McIntosh sugarhouse, were to a certain extent experimental in nature we can hope to identify modifications to the sugarhouse that might help us to understand the science of the era. Beyond changes in the sugarhouse structure, itself, any archaeological information that supports the possible relocation of space should be noted. These kinds of changes could explain alterations in the activity areas projected at the infrastructural level.

Thus, the activity model predicts where certain activities are likely to take place and what kinds of artifacts might be associated with them. At the infrastructural level the following activity areas are predicted for the McIntosh sugarhouse:

A. Outside the sugarhouse:

1. cart unloading area,

2. cane stacking/storage area,

3. baggasse disposal/drying area,

4. fuel storage/handling area,

5. corral,

6. several rest/eating areas for the workers.

B. Inside the sugarhouse:

1. milling area,

2. animal tread and care area,

3. clarification area,

4. boiling area,

5. curing area,

6. storage area for the processed sugar and molasses.

Within these areas any evidence of structure and superstructure should be noted and evaluated in terms of assigning significance to the site. Interpretation of the archaeological findings should also be based on these relationships.

CHAPTER III

ARCHAEOLOGY AT THE McINTOSH SUGARHOUSE

Archaeological investigations were conducted at the John Houstoun McIntosh Sugarhouse between 1 September 1981 and 30 October 1981. The field crew was obtained through the Georgia Department of Labor. These workers had no previous experience with archaeology; however, they had a personal interest in the project and pride for their local historic resource.

Field Methods

An excavation coordinate of grid system was established in order to provide both horizontal and vertical control for all excavation units. A permanent bench mark was established at grid location 1000R1024 (near a red cedar tree approximately 9m east-northeast of the northeast corner of the ruins). Elevation at the bench mark was determined to be 4.96m (16.3 feet) above Mean Sea Level (MSL).

The grid system was established on a magnetic north/south axis. This axis was selected not to provide consistency with the axis of the building, but to attempt to discourage sampling bias associated with the configuration of the architecture.

The grid system is designated in the same manner other investigators have used for excavations on state lands and should simplify comparisons with other state owned archaeological and historic sites. The system employs two sets of numbers separated by the letter "R". The first set of numbers designates the north

location of any point to be determined and the second set or "R" number determines the eastern location.

Excavation units are at two by two intervals on the grid system (even numbers only). The units are designated by the grid coordinate for the southwest corner of the unit. For example: 1000R1000 is a 2x2m square east of Unit 1000R998 and north of 998R1000 and so forth.

In areas where the archaeological situations required it, the 2x2m excavation units were divided into smaller 1x1m squares. Each was designated by the coordinate number for the larger 2x2m excavation unit in which it was located with the addition of a letter designation. Thus, a 1x1m square located in the southwest quadrant of Unit 1000R1000 would be further identified as 1000R1000A; "B" is the southeast 1x1m, "C" the northwest and, "D" the northeast.

In all, the equivalent of thirty-two 2x2m units were excavated (figure 6). They were excavated to varying depths depending on the archaeological situation. Depths ranged between 10 and 150cm. Approximately six of these units were located in the mill room (westernmost room), ten in the boiling room (center room), three in the curing room (easternmost room), four on the north porch, three on the south porch, six 1x1m squares on the south side of the building and six 1x1m squares in the well area (northeast side of the building).

Generally, excavation units were removed at 10cm arbitrary levels. Exceptions to this include: the well area where 5cm levels were removed in order to provide greater control of artifacts and

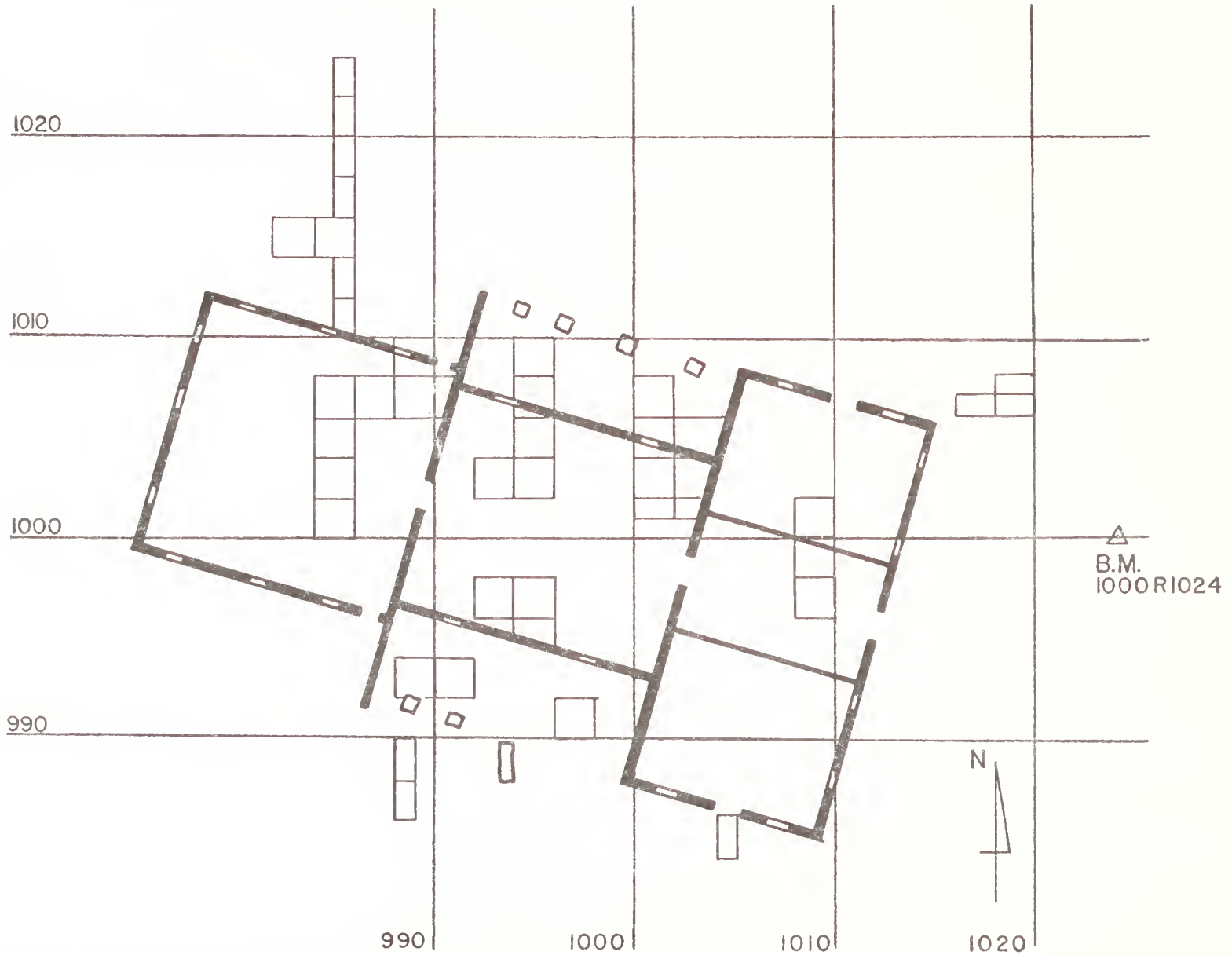


Figure 6. Excavation Units.

enhance recording data, and in the boiling room where culturally determined statigraphy exceeded 10cm levels.

All excavated materials were screened through hardware cloth (12.7mm or .50"). Features containing animal bone were screened through a 6mm mesh size. Any other areas that warranted it, either through the experience of their excavation or through evidence at the screen, were fine screened through the 6mm mesh. In one area of the boiling room a disturbed area with great depth and extent was split between screening and not screening. In this case, units not screened lay between areas that were screened and the speed of excavation was reduced to provide a thorough examination of the material removed: whole, partial and fragmented brick, mortar fragments, and crushed and broken tabby.

Elevations were recorded using a transit and rod. These data provide vertical control for the excavations and the basis of the contour interval displayed in Figure 2. The base of excavation units and levels within units were also recorded in this manner. Base plans of all excavation units were drawn and, where appropriate, photographed. Drawings were made of selected features at each level of their excavation. Additionally, profiles were recorded for at least two sides of all excavation units. Differences in soils were established using Munsell color designations and intrinsic structure.

Through the assistance of the Navy, a "cherry picker" was obtained to photograph large excavation areas. Further, the Navy Fire Department was most cooperative in providing equipment to wet down

excavation areas during the long dry period at the site. This reduced the fragility of standing profiles and aided in locating features.

Artifact Analysis and Reporting

All artifact materials, ecofacts, soil samples, tabby samples, and excavation records were taken to the Laboratory of Anthropology at the University of Florida. Cataloging and analysis of these materials are complete. Artifacts were classified in the system developed by Sprague (1981). His system, "A Functional Classification for Artifacts from 19th and 20th Century Historical Sites," lends itself well to the research design of this project.

Sprague divides artifacts into the following categories: 1, Personal Items -- clothing, footwear, indulgences (tobacco pipe, flask, snuff box), pocket tools, etc.; 2, Domestic Items -- including furnishings, housewares, cleaning and maintenance, etc.; 3, Architecture -- construction materials, hardware, plumbing, power utilities, heating systems, conveyances, safety (lightning rods), etc; 4. Personal and Domestic Transportation -- vehicles, maintenance equipment, ritual, etc.; 5, Commerce and Industry -- agriculture, hunting, fishing, gathering, trapping, manufacturing, etc.; 6, Group Services; 7, Group Ritual; 8, Unknowns. These categories work well to draw attention to distinctions between infrastructure, structure, and superstructure. They also organize the materials into groups that can be analyzed with respect to the activity areas.

Archaeological Data

The archaeological findings will be reported in the following order. First, mill room excavation units will be discussed. The discussion will include the areas excavated, any special circumstances encountered, and artifacts located. Second, excavation units in the boiling room and north porch will be combined for discussion because they are archaeologically continuous and functionally related. Third, the curing room will be considered. The excavation area outside the south door of that room will be addressed at the same time. Fourth, the excavations in and near the south porch will be reviewed. Fifth, the importance of the area north of the mill room will be reported. Sixth, and finally, the well area excavation findings will be discussed.

Very few artifacts associated with the milling and boiling machinery were recovered. This may in part be due to the fact that wood, tabby, and sand mortared floors were present in most areas of the building. When sugar production was stopped at the building, it would have been easy to remove all equipment and related parts for storage, use elsewhere, or sale. Additionally, broken or discarded equipment or parts could be easily removed for repair or discard outside work areas.

It should be pointed out that the majority of artifacts recovered at the McIntosh sugarhouse can be attributed to public use of the site over the last thirty years. The analysis of this material has been limited to an attempt to establish current usage patterns for

aid in site management. This material will listed here. A more thorough commentary regarding the implications of these modern artifacts will be found in the final chapter of this study.

The Milling Room

A total of six 2x2m excavation units was opened in the milling room (west room). Further, four 1x1m squares (or portions of them) were excavated adjacent to one door and two walls. These excavation units (figure 7) represent about 12% of the floor space.

Depth of excavation was determined by the presence of a tabby floor. The floor was found in all units and ranged between 6 and 22cm below ground surface. In areas where smooth, uneroded and undisturbed tabby could be examined the floor appeared level, at approximate elevation 4.45m MSL. In areas where holes in the floor were encountered excavation continued to the base of the tabby. In general, the floor was only 6cm thick. Excavation units next to the walls revealed that the floor was added after wall construction.

A large live-oak tree growing in the room made excavation and interpretation difficult. Because of its size and location, efforts were taken to prevent killing the tree. Its large roots followed the top of the tabby floor. Through physical and chemical erosion the roots have destroyed large areas of the floor. Acids from the roots combined with ground water dissolves the calcium in the tabby, leaving a smooth textured surface under the root. In weak areas of the floor, where the roots have punched through it, the root hole is smoothed-out

and difficult to distinguish from a human-made surface. This is even more true where the root had died and rotted away.

Several of the smooth-sided holes were obviously not produced by root action and are so indicated in Figure 7 (see Burned Timber, A-B). Some are particularly important. Located in Units 1004R984 and 1006R984, they are angular and have finished edges. If the mill was located in this area and resting on prepared soil or wooden foundation it may have rested next to these edges. In support of this conclusion are at least two wooden beams which can be seen in the tabby floor. They are located in the same excavation units. Finished edges in Unit 1000R984 are aligned with one of the beams, but no wood fragments were found there. The 6cm thickness of the floor would also support this conclusion because it would be expected that a weight-bearing floor for heavy iron machinery would be much thicker.

None of the holes with finished edges could be assigned to architectural posts installed to support the second story floor of the mill room. It was expected that some system of beams and posts was used to hold the upper floor. No evidence on the walls indicates that the floor was attached to them, with the exception of the east wall. In that wall there are two square holes about 3m apart and 2.28m above the tabby floor. They are a few centimeters higher than the door lentil in same wall. These holes were cut into the tabby wall after it was constructed and are 27cm square, large enough to hold a 10 inch beam.

The only artifacts that can be attributed to the time of

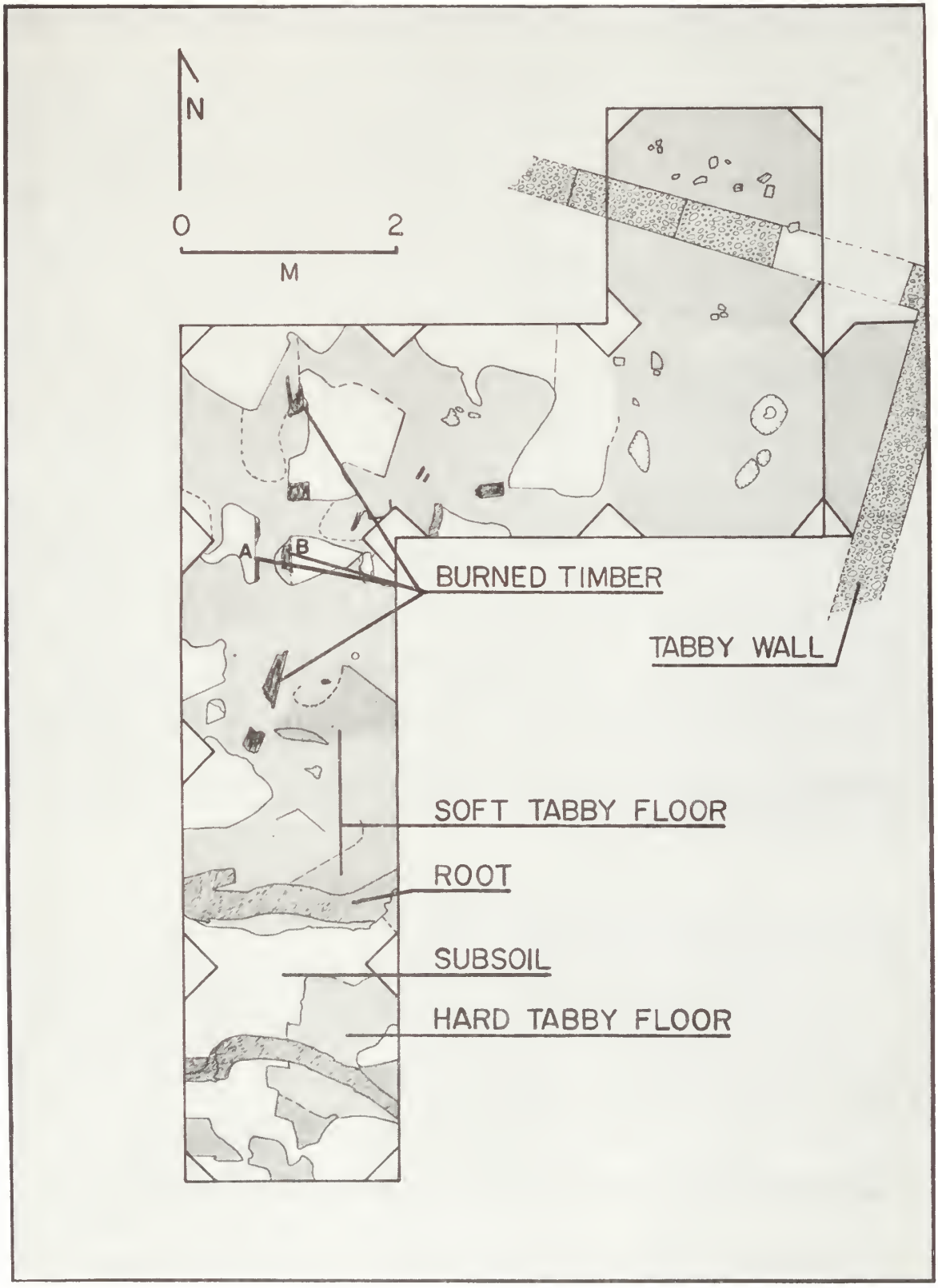


Figure 7. The Milling Room, Plan View.

sugarhouse construction and use are 3 whiteware plate fragments (2-blue shell-edged and 1-plain) and 2.786kg of cut nails. Most of the nails are burned and well preserved. Only 3% (by weight) could not be classified by size. In all, there were 692 nails asigned to 7 lengths. The seven lengths are 5.0 cm (2"), 6.0cm (2.4"), 6.5cm (2.5"), 7.3cm (2.9"), 8.6cm (3.4"), 10.8cm (4.25") and 11.4cm (4.5"); and there were 464, 26, 162, 3.7, 1, 1 and 1 of each size, respectively.

Of the other artifacts located in the mill room, most are modern Personal Items of Indulgence - remains of tobacco products, bottle glass and tops, aluminum pop-tops, unidentified plastic, etc. Bottle glass represents 99% of this material. The glass has a total weight of 13.3427kg; 50% is clear, 42% brown, 4% green, 3% light green and 1% multi-colored. Other Personal Items include food packages (potato chips bags, candy wrappers, sandwich bags, etc.), a conical whetstone, a "D" cell battery, a "Cricket" disposable lighter, and the clasp of a stick-pendant earring.

The Boiling Room and the North Porch

Twelve 2x2m excavation units were opened in the boiling room and on the north porch. Some of these were partial units because of the tabby room walls and others were 1x1m squares; size was in response to the archaeology present. About 68 square meters (10% of the available area) were excavated in the boiling room and on the north porch 40 square meters were exacavated (25% of the available area).

Depth of excavation ranged between 2cm below ground level (the top of a tabby retaining wall in Unit 1006R1000 [4.9m MSL] and the tabby floor in Units 1002R992 and 1000R1000 [5.1m MSL]) and 1.72m (3.24m MSL) below ground level in Units 1002R1002, 1004R100 and 1004R1002. These deep areas reached sterile soil beneath the furnace. The absence of large trees in the room aided in efficient excavation, data recovery, and recording.

Three areas were excavated. The first area was near the west opening in the north wall. This opening, as stated earlier, was thought by some observers to be a doorway to the north porch. The second area was also near an opening reported to be a door, the east opening in the north wall. Archaeological findings in these two areas resulted in the decision to extend the excavation through the openings and on to the north porch. The third area was adjacent to the south wall. It was excavated to determine if the archaeological and architectural findings in the first two areas were duplicated in the southern half of the room.

Area one. Inside the boiling room (figure 8), the builder's-trench for the north wall was identified. The base of the trench and the wall was 64cm (4.26m MSL) below ground surface and extended 30cm from the wall. The builder's-trench had been back filled. No artifacts were recovered from the fill. Although excavation did not continue below the wall, it was learned that the wall was sitting directly on sterile soil.

Above and adjacent to the builder's-trench was a zone of

loose brick, brick fragments, lime mortar fragments and soil. The matrix of this zone was so dense that it prohibited penetration by large roots; in fact chemical action on the lime fragments had acted to cement it. It is 25cm to 30cm thick (4.76m to 4.46mMSL). The zone extended south from the wall 3m. At that point, the zone thinned and ended within an additional 50cm. At the base of this zone, 1.3m from the wall, five whole Savannah Gray Bricks were located. Four of these bricks were in situ, set flat and bound together with mortar. The mortar joints were parallel to or at right angles to the wall. Three of the four bricks had mortar on their top sides. It could not be determined if the brick represented a single or multiple course work.

On top of the mixed brick, mortar and soil zone was another layer with a similar matrix. The fragments were much smaller and appeared, near its top, to be more crushed than broken. This could be the result of root action and compaction by site visitors. The layer is generally 10cm to 15cm thick and covered with 5cm to 10cm of topsoil, fine roots and leaf mold. Near the wall the layer is somewhat thicker.

At the southernmost edge of the excavation a tabby floor is exposed at the surface. Probing revealed that the floor extended between the east and west doors of the room and was the cause of the slightly raised area seen in Figure 2. No finished edge could be found on the north side of the floor. Instead, a zone of tabby rubble extended (1.6m) from the hard tabby floor under the previous layer of

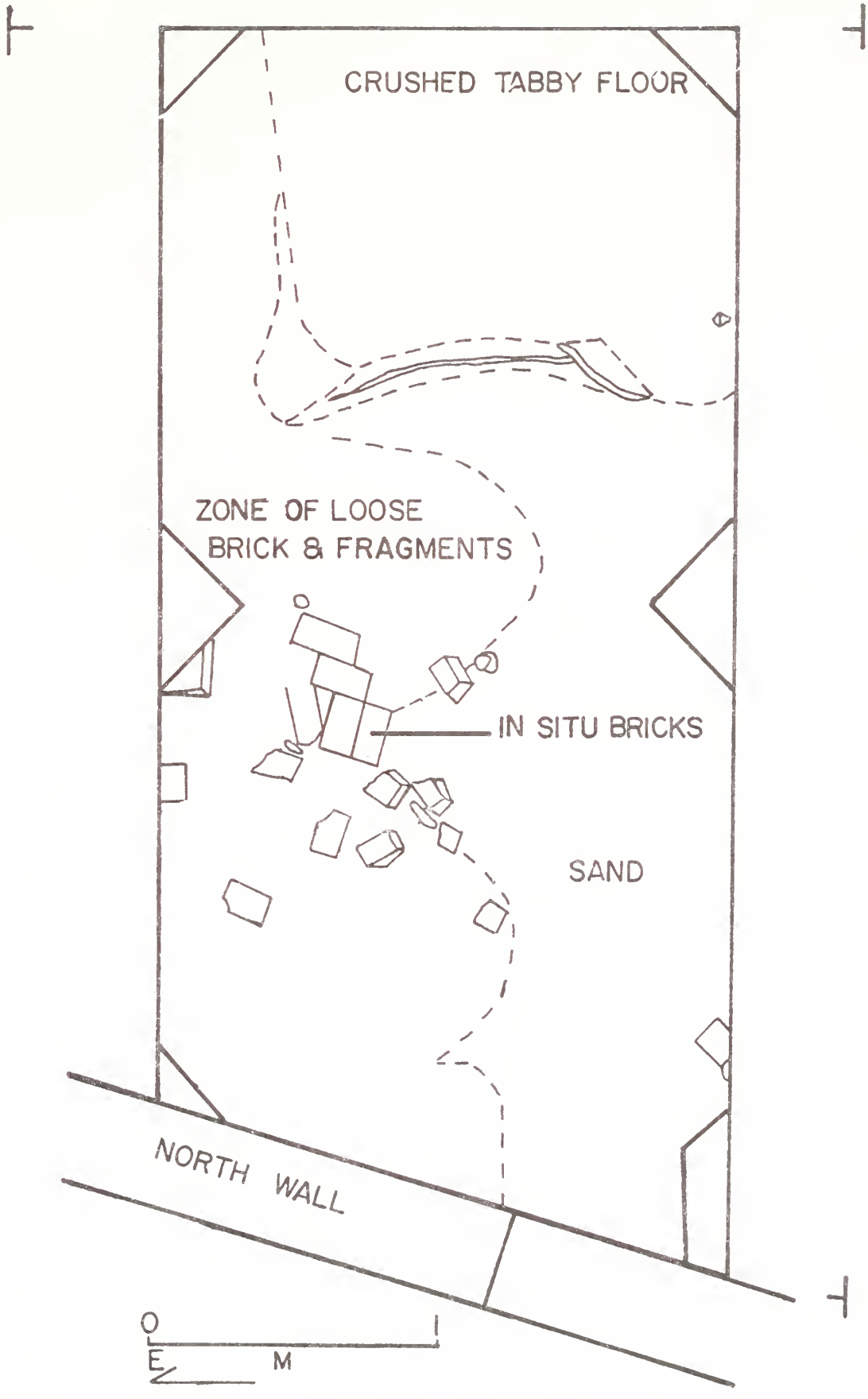


Figure 8. The Boiling Room, Area 1, Plan View.

small brick, mortar and soil. The tabby rubble was 20cm thick next to the hard floor and tapered out as it reached northward.

Like the mill room, Area One in the boiling room contained a significant number (417) of cut nails. When the number and sizes are compared there is virtually no difference in the ratios. The interesting aspect about the nails in this area is their distribution within zones. As already mentioned, there were no artifacts (including nails) recovered from the builder's-trench. The zone within the situ brick, large brick fragments, and mortar contained 4% of the nails. The zone with smaller brick fragments and mortar had 50% of the nails.

The upper layer, with the crushed material and small roots contained 19%, and the remaining 26% of the collection were found resting on the top of the tabby rubble associated with the floor. They were in the upper 10cm to 15cm and were consistent with the modern artifacts reported in the mill room. No other artifacts were recovered from this area that could be linked to the period of construction and operation at the sugarhouse.

The porch excavation in Area One was not continuous with the boiling room. Below the wall opening to the porch a tabby footing was located 5cm (4.76m MSL) below ground surface. Excavation of the builder's-trench indicated that the footing was a solid extension of the wall. The top was eroded and sloped down to the west and north.

The area outside the wall was excavated to -20cm. At that level a badly crumbled tabby surface was encountered. This material

appeared to be the remains of a tabby floor. The bad condition of the floor is attributed to a large red cedar growing at the edge of the excavation unit. Six per cent of Unit 1006R994 was obscured by massive roots from the tree. These roots could not be removed without destroying the tabby floor.

The floor extended northward 1.4m from the wall. There it was solid and slightly raised. The exposed portion of this solid portion paralleled the wall for 1.1m and turned back toward the wall for 50cm. At that point the raised area was bisected by a large branching root. It was not recognizeable on the other side of the root. Above the wall opening (figure 9) mortar scars can be observed. It is obvious from the position of the raised tabby "floor" and the scars that a brick chimney stood in that location. Therefore, the tabby area in the excavation was the chimney stool.

Further excavation beyond the chimney stool revealed no ash or burned material. Scattered brick fragments and cut nails (76) were the only artifacts recovered. They were found on the chimney stool and beyond. No features could be located outside the chimney stool.

Area two. This was the most interesting and most tedious to excavate. Inside the boiling room, depth of excavation ranged from 10cm to 60cm (3.68m MSL) below ground surface. On the north porch the depth ranged from 20cm to 50cm (3.68m MSL) below ground surface.

In the boiling room, three zones of fill material were encountered. The lower zone contained whole and broken brick, mortar and soil. The middle zone contained the same material but the brick

was more fragmentary, smaller pieces. The upper zone was comprised of crushed brick and mortar with topsoil, roots and leaf mold. There were no large trees nearby to inhibit excavation.

The bottom of the excavation was determined by sterile soil or in situ brick work (figure 10). It is clear from the positions of the brick work that this was the area of the boiling furnace. Soot stains are on bricks that lined the fire box. The bottom course of brick was coated with residual ash. The shape of the firebox indicated that fuel was loaded and ash removed from the north porch. Because an area adjacent to the southern extension of the excavation contains an uneroded portion of the central boiling room tabby floor, it is possible to define the base of the firebox with respect to that floor. The floor elevation is 5.6m MSL and the base of the firebox is 4.46m MSL.

One peice of annular decorated polychrome-whiteware (in figure 11) was recovered from the boiling room portion of the Area Two excavation. This brown and blue fragment of a bowl or plate was located in the lower zone of brick and mortar rubble.

Cut nails (669) were also recovered. The lower zone contained 21%; the middle zone- 24%; and the upper-54%. Fragments of metal flashing were also recovered: 119.8g in the bottom zone, 37.2g in the middle and 9.4g in the upper zone. No other identifiable artifacts were recovered that could be associated with construction or sugarhouse activity.

On the porch the stratigraphy was uncomplicated. The bottom

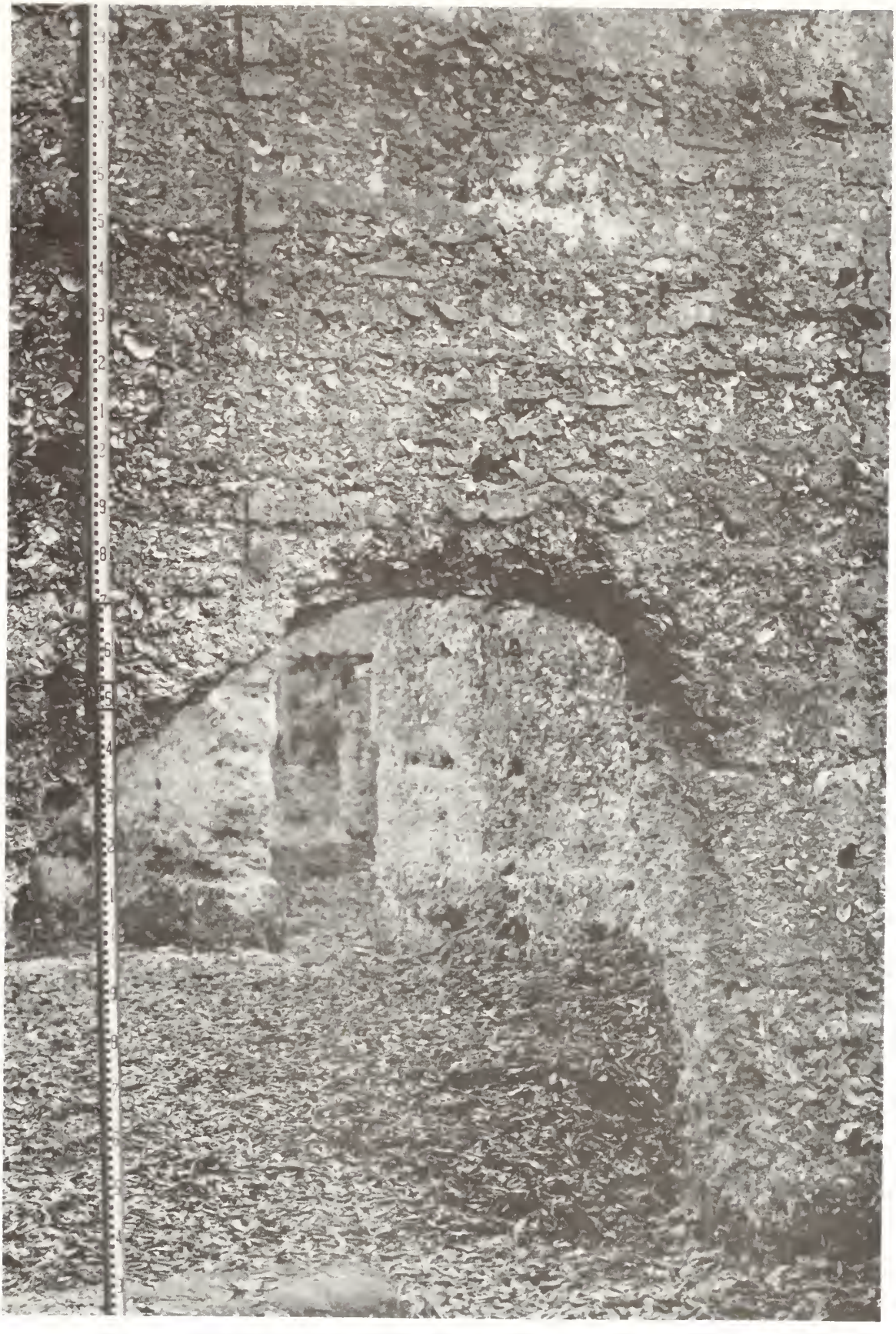


Figure 9. Chimney Mortar Scars. (Note: the rounded "doorway" is the wall opening that connects the boiling train flue to the chimney. It has been enlarged since the time of abandonment of the mill.)

zone contained dark ash and crushed charcoal. It was 6cm thick, rested on sterile soil and was at the level of the furnace opening. The other zone was an extension of the brick and mortar rubble that extended out of the boiling room. This zone was covered with a layer of root mass, topsoil, and leaf mold.

Three tabby retaining walls in combination with the north building wall (figure 12) surround a staging or service pit for the furnace. This service pit was used to fuel the furnace and remove ash. The retaining walls were constructed separately from the building. All of the retaining walls are 30cm (11.8") thick. The east wall is at least 60cm tall. Excavation did not extend to the base. The north and west walls are higher (at least 10cm) and taller (at least 15cm). It is not possible to determine their exact height because the tops of the walls are eroded. Together the retaining walls, the north building wall and the face of the furnace define a floor area of 7.8 square meters (84 square feet).

Excavation here revealed that the north building wall is resting on a brick base. This was not the case at the Area One excavation. There the wall was standing on sterile soil. At the end of the wall next to the furnace (figure 13) there are three courses of brick. Beyond that point there are two courses. Because the north wall is unstable, further excavation to determine the length of the brick work was not undertaken.

A post-mold was located near the southwest corner of the service pit. The post-mold indicated that the post was 13cm square

Figure 10. The Boiling Room, Area 2, Plan View. The base of the boiling furnace can be seen with the narrow throat extending to the north wall and out to the service pit on the porch.

(5.1" square). It rested next to the north building wall and extended 62cm (24") below the building wall and 50cm (19.6") below the west retaining wall. It is interpreted to be associated with the construction of the retaining wall.

Artifacts recovered from the service pit include cut nails, ceramics, bottle glass, bone, metal flashing, other metal, and wood. No artifacts were recovered in situ or from the ash zone. Because the other zone was homogeneous, artifacts from it have been grouped except those in the top 10cm. This distinction was made to lessen the possibility of mixing recent material with that from construction and boiling related activity.

The upper level had 44% of the cut nails (1103) located in the service pit. The other zone had 520 cut nails; 31% of the total in the top half and in the bottom half, the remaining 24%. The metal flashing fragments were concentrated near the bottom of the zone. There were 973 (1.73kg) of these fragments. The other metal artifact was a flat square of iron 10x6cm. Its function could not be determined.

Three ceramic artifacts (included in figure 11) were located. One is a rim sherd of an "iron-stone" coffee mug. The others are whiteware, one of which is plain and the other annular decorated polychrome.

Eight sherds of olive-green bottle glass were recovered. The larger sherds are illustrated in Figure 14. These were located throughout the midden and none was next to each other.

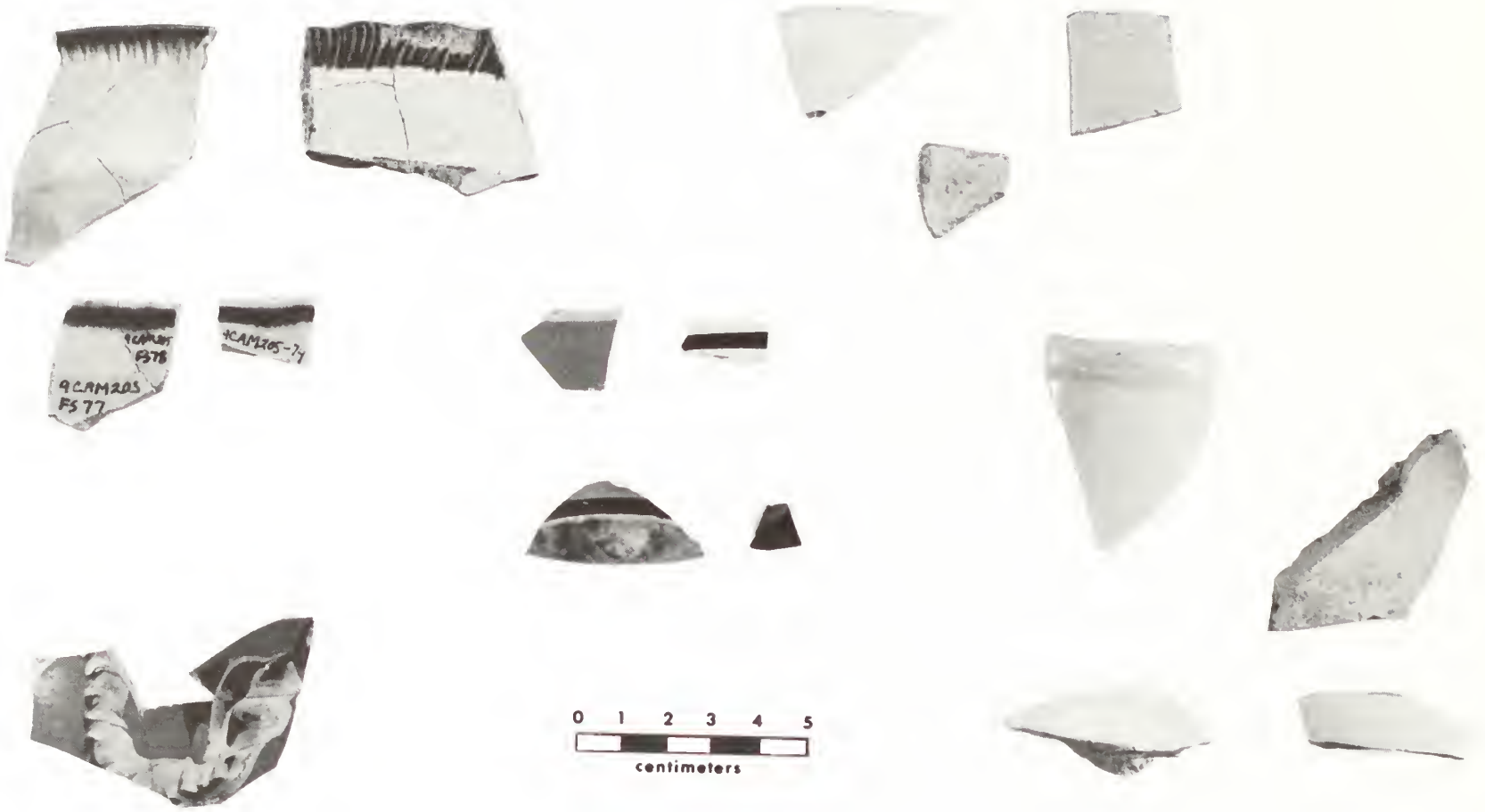


Figure 11. Whiteware Ceramics.

The faunal material consists of 289 (116.5g) bone fragments. The material was analyzed by ethno-zoologists at the Florida State Museum. Individuals represented in the collection were: racoon, pig, unidentified ungulate, and box turtle. None of the individuals showed signs of butchering or burning.

The wooden artifact was a portion of a pine plank. It is 76cm long and 1.5cm thick. No cut edges are recognizable.

A number of whole bricks were recovered from both portions of Area Two. They were all Savannah Gray bricks. Thirty two portions of impressed fire bricks were also recovered. None of these could be cross-matched. However, the impressed legend could be reconstructed. It read as follows:

BERRY'S
PREM.
FIRE - PROOF

This is not the same as reported in a letter published by Coulter (1937:221). There the impressed legend is stated to be "BERRYS IMP. FIRE PROOF".

Area three. As stated previously,this was excavated to establish any similarities or differences between the north and south sides of the boiling room. Before the other areas were excavated, it was expected that this area would contain a second boiling train. This expectation was based on reports in the historic records indicating that two trains were generally installed in a sugarhouse of this scale. Further, Floyd (1937:155) interpreted the boiling room to have two sets of boilers (one on each side of the room) served by a

Figure 12. Furnace Service Pit, Plan View. The three tabby retaining walls can be seen. One is next to the east tabby wall (top of photo). The north and west retaining walls can be seen in the lower one-third. Also note the throat of the

centrally located chimney. He discouraged thoughts of locating chimneys on the porches because there were "no natural" openings to the porches through which flues could be run.

After locating the furnace in the northeast corner of the room, and a chimney stool at the west end of the north porch, the evidence suggested that there would not be a second boiling train on the south side of the room. The area selected to confirm this conclusion was located near the center of the room for several reasons. First, on the north side no excavation had been undertaken to define the center section of the flue connecting the furnace and chimney. That effort had been avoided to prevent the possibility of weakening the north wall through exposing too much of its base. Second, probing had revealed that the tabby floor in the center of the room did not extend to the south wall. Third, and last, probing had indicated an isolated buried surface in that area.

Sterile soil was encountered at 20cm (4.76m MSL) below ground surface. Near the center of the excavation a single course of bricks was located (Figure 15). These bricks were mortared and constituted a rectangle 1.4m X 1.05m (4.59' X 3.44'). The short sides of the rectangle were parallel to the south wall. The top sides of the bricks were covered by a thin layer of mortar. Near the edges of the rectangle the mortar revealed that there had been a riser or wall of brick on all four sides. Further, the rectangle was divided in half at the center of the long sides, resulting in two compartments, each with an internal area 50cm X 85cm. The mortar lipped up at the

Figure 13. Furnace Brick Work, Profile.

contact with the riser. There is no evidence to suggest that the risers were more than one brick course high; however, the lipping would imply that the brick work was designed to contain a liquid. To support this implication 154 baked clay sherds (some are illustrated in figure 16) were found in association with the brick work. These sherds are sufficiently bulky to indicate that the container was too large to move far from the area. In fact they may represent a gutter or trough instead of a container.

In addition to the now predictable cut nails, one other artifact was recovered from this area. This was a portion of a stoneware jug with a brown glaze. It is pictured in Figure 16. It was located within 10cm of ground surface and was probably not associated with boiling room activity.

Most of the cut nails in this area were located directly on top of the sterile soil or brick work. Of the total 1211 nails, 701 (58%) were at the base of excavation. The others were mixed throughout the 20cm of topsoil.

The Curing Room:

Three excavation units were opened to confirm the absence of a wooden floor in the center section of the room and to determine if a cellar was present in the center or side sections of the room. For manageability, the excavation units were continuous, two in the center section and one in the north. Because the north and south sections of the room had wooden floors installed when the walls were constructed,

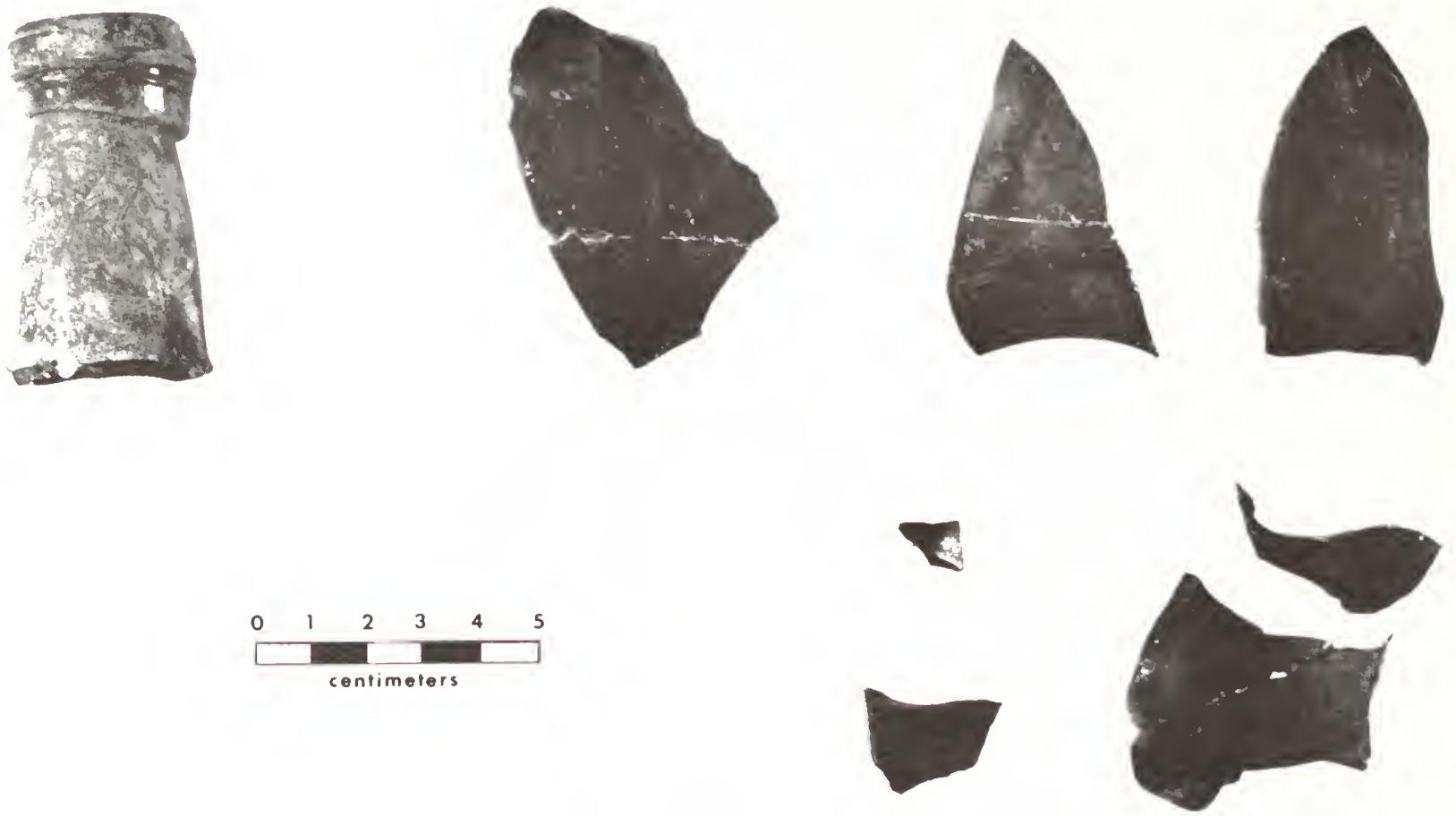


Figure 14. Olive-Green Bottle Glass.

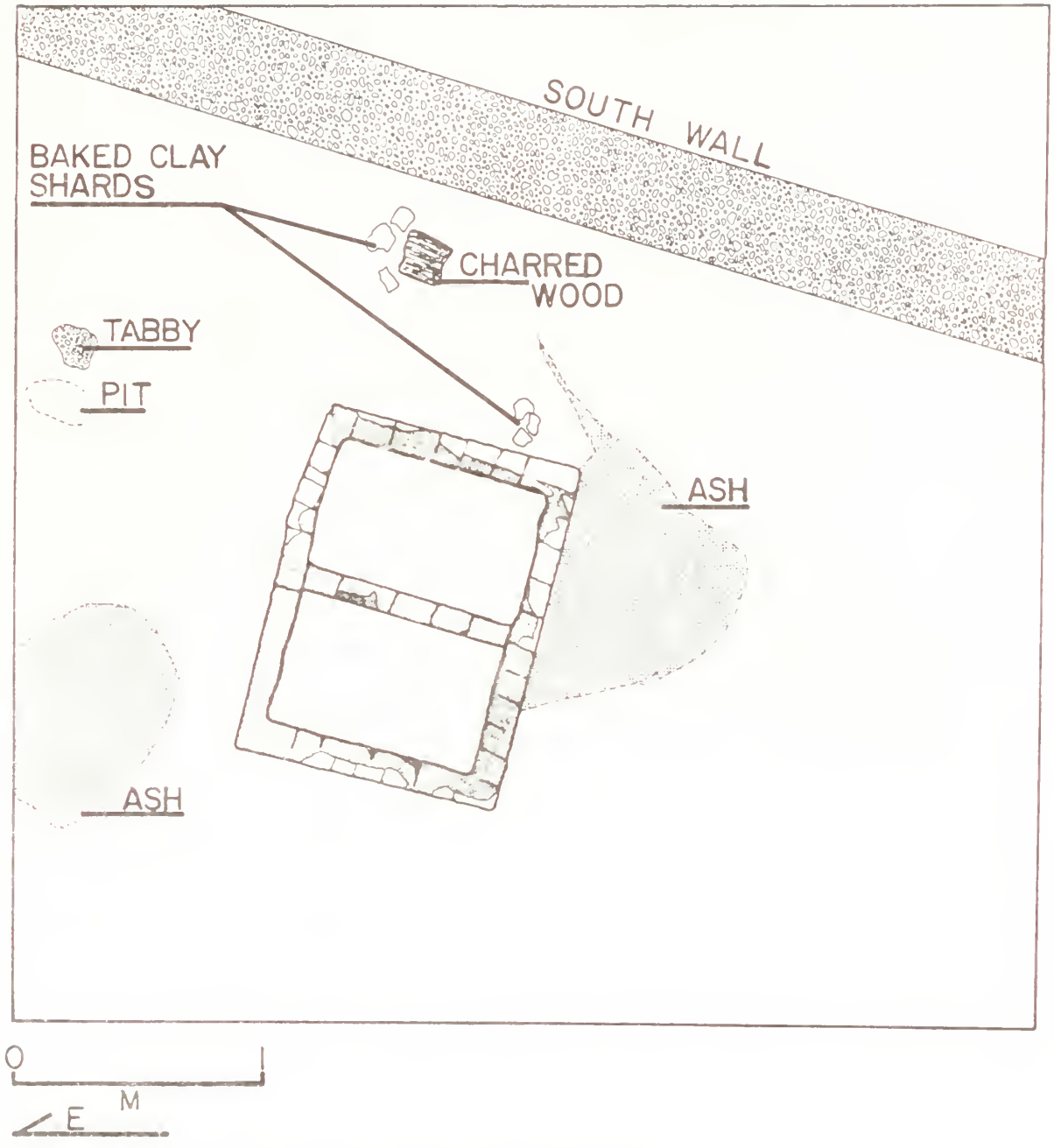


Figure 15. The Boiling Room, Area 3, Plan View.

Figure 16. Baked Clay and Jug Sherds.

and testing was accomplished in the north section, no excavation was undertaken in the south section. An additional area was excavated outside the south doorway.

In the center section the base of excavation was 48cm (4.02 MSL) below ground surface. Ranging between 12cm and 30cm below ground surface a hard, apparently cemented, floor was encountered. It was badly decomposed. This factor may explain its varying thickness. The base of the floor is generally level at 4.20m MSL. On top of the floor is a zone of well scattered brick and mortar fragments. This zone extends from ground surface to the hard floor. The base of the tabby wall that separates the center and north sections of the room was located at 4.36m MSL. The wall stands 1.22, (4') from base to top.

Artifacts recovered in this area include cut nails and part of a door hinge. The hinge (figure 17) was face down on the hard floor. Wood fragments were still attached to it. There were 576 cut nails recovered. Of those, 78% were within 5cm of the floor.

In the north section of the room sterile soil was 8cm (4.76m MSL) below ground surface. The 8cm zone is topsoil with modern materials in the upper portions. No features, including a builder's-trench, were recognizable at the base of excavation. Cut nails were found scattered on and slightly mixed into the top soil. In all, 276 nails were recovered. Additionally, 4 chicken bones were recoverd just under the leaf mold.

Figure 17. Door Hinge.

Outside the south door a small excavation area was opened to identify any features associated with the door. Excavation was stopped at 50cm (5.8m MSL). At that depth the base of the south building wall was reached. The wall rests on sterile soil in a builder's-trench. The top of the builder's-trench is 24cm below ground level (4.62m MSL) and 40cm wide. At the time the sugarhouse was in use this level was ground surface. This is confirmed by wheel ruts left by wagons parked at the door (figure 18). Seventy five cut nails were recovered from this excavation, 69 within the top 10cm, 5 between 10cm and 20cm and the other nail was located at 22cm below ground surface.

Three other artifacts were located that are attributable to sugarhouse activity. They are two fragments of a white clay pipe bowl and one white clay pipe stem (figure 19). They were located at 10cm below ground surface.

The South Porch

Three excavation units were opened on the south porch. In each, sterile soil was reached 20cm below ground surface. No activity areas or archaeological features were located. The ever present cut nails were the only artifacts identified to be contemporary with the building. When the nails were analyzed in the other areas of the sugarhouse they seemed to be distributed evenly in all areas and concentrated by depth. On the south porch they still concentrate by

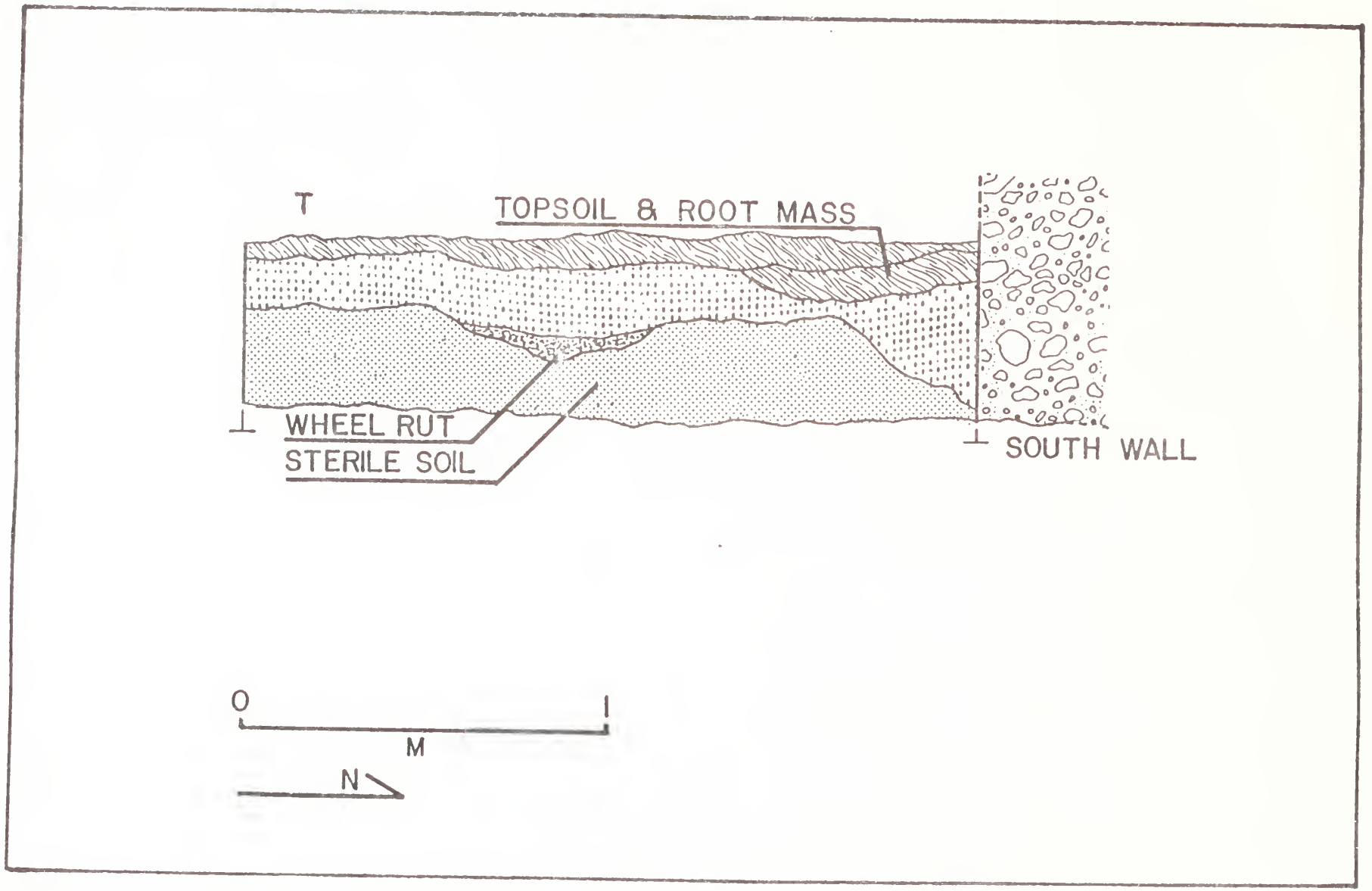


Figure 18. Wheel Ruts Outside South Curing Room Door, Profile.

depth with 72% located in the top 10cm. The new factor is aerial distribution. The unit at the west end of the porch contains 51% of the collection. The unit directly east has 30% of the nails and the eastern most unit has the balance, 19%.

A test trench was excavated beyond the south porch. It was 1m X 4m with the long axis north-south. It began 1m past the west porch wall. No activity areas or archaeological features were located. Sterile soil was encountered 10cm below ground surface. Twenty four cut nails were recovered. In the first 2m, 24 cut nails were found, 11 collected in the second 2m.

The Well.

A 1m X 4m excavation trench was opened, on an east-west axis, across the depression near the northeast corner of the sugarhouse. Within 20cm below ground surface a circular dark stain was revealed. Because the stained area was off center from the trench, the west area was not excavated beyond the 20cm level. One hand painted whiteware sherd (in figure 11) was recoverd. It was not in situ. No cut nails were located.

The east area was expanded to include all of Unit 1006R1018. The Unit (figure 20) was then excavated to 1.60m (3.16m MSL) below ground surface. Excavation was terminated when the watertable was reached.

The lower portion of the excavation revealed a wood-box

Figure 19. White Clay Pipe Fragments.

casement. It was made of planks and extended upward from the base of excavation 56cm at the corner. Planks were set vertically and were supported by an interior post at the corner. On the exterior a horizontal plank appeared to reinforce vertical planking. The top of the planking was burned. Charcoal (.12g), wood fragments, four pieces of planking, and one small brick fragment were also located. Additionally, one barrel header was located. No artifacts were recovered from outside the casement.

Above the casement, in the well fill material, the following artifacts were recovered: 17 fragments of planking, 6 unidentified wood fragments, charcoal and 3 brick fragments. At 118cm below ground surface the top of undisturbed well fill was reached. Leaves, 4 pieces of wooden planking, 3.3g wood charcoal, and 3 brick fragments were recovered.

Between 40cm and 118cm below ground surface there was no perceivable change in stratigraphy. Artifacts located were: 1 piece of post (38.0cm long), 1 cedar stump, 1 pine cone, 51.7g unidentified wood, 20.4 g charcoal, 2 brick fragments, and one piece of whiteware (hand-painted, blue-on-white, in figure 11).

The excavation level between 20cm and 40cm contained a mixture of modern and 19th century artifacts. First, 2 whiteware sherds were recovered. One was plain; the other was hand-painted, blue-and-green-on-white. Metal artifacts included 1 cut nail, fragment of a plastic lined tin can and 34 (23.8g) pieces of unidentified metal. Wood (4.1g),

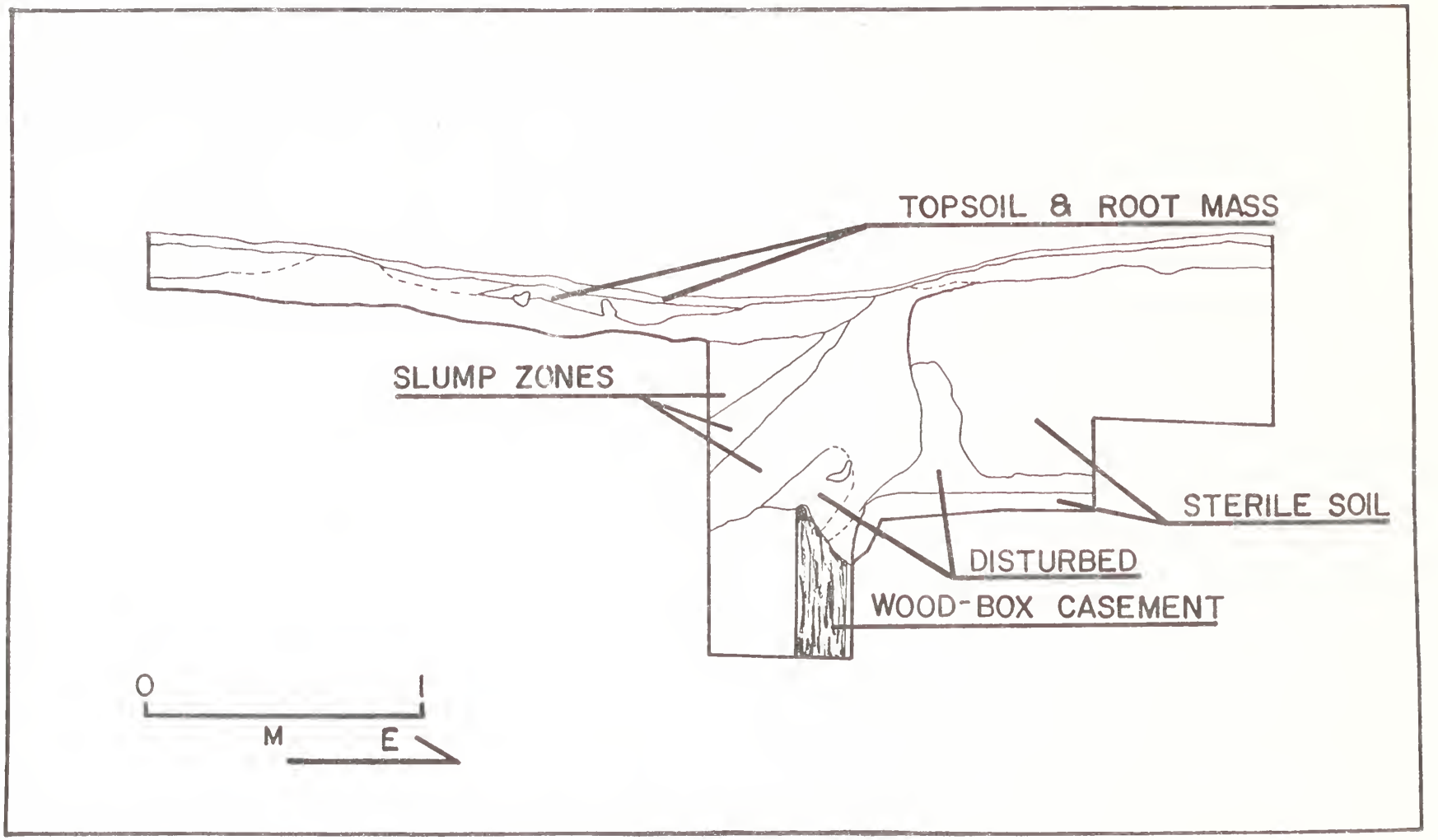


Figure 20. The Well, Profile.

wood charcoal (4.1g), and brick fragments were present. Also, modern bottle glass was found.

In the top 20cm only two artifacts were recovered that can be associated with construction or sugarhouse activity. One is a cut nail and the other is a fragment of decorated whiteware. It is hand-painted, blue, green and orange on white.

North of the Mill Room

This area (figure 21) was excavated for two purposes. First, if a ramp to the second story door of the mill room existed it would necessarily tie down in this area. Also, examination of the ground surface indicated the presence of archaeological material. A test trench was excavated. Starting at the north wall of the mill room the trench extended 14m to the north. Only in the area of the wall did the excavation exceed 10cm in depth.

A tabby floor was located at 10cm (4.46 MSL) below ground surface. The floor began at the building wall and ended 13.52m north of the wall. At the end was a layer of unconsolidated shell. Probing beyond the excavation did not locate other areas of hard tabby; only the unconsolidated shell.

Next to the building wall, the builder's-trench was located and excavated. The base of the wall is 48cm (4.11m MSL) below ground surface. It rests on sterile soil. The builder's-trench is steep sided and 50cm (19.7") wide. From examination of the builder's-trench

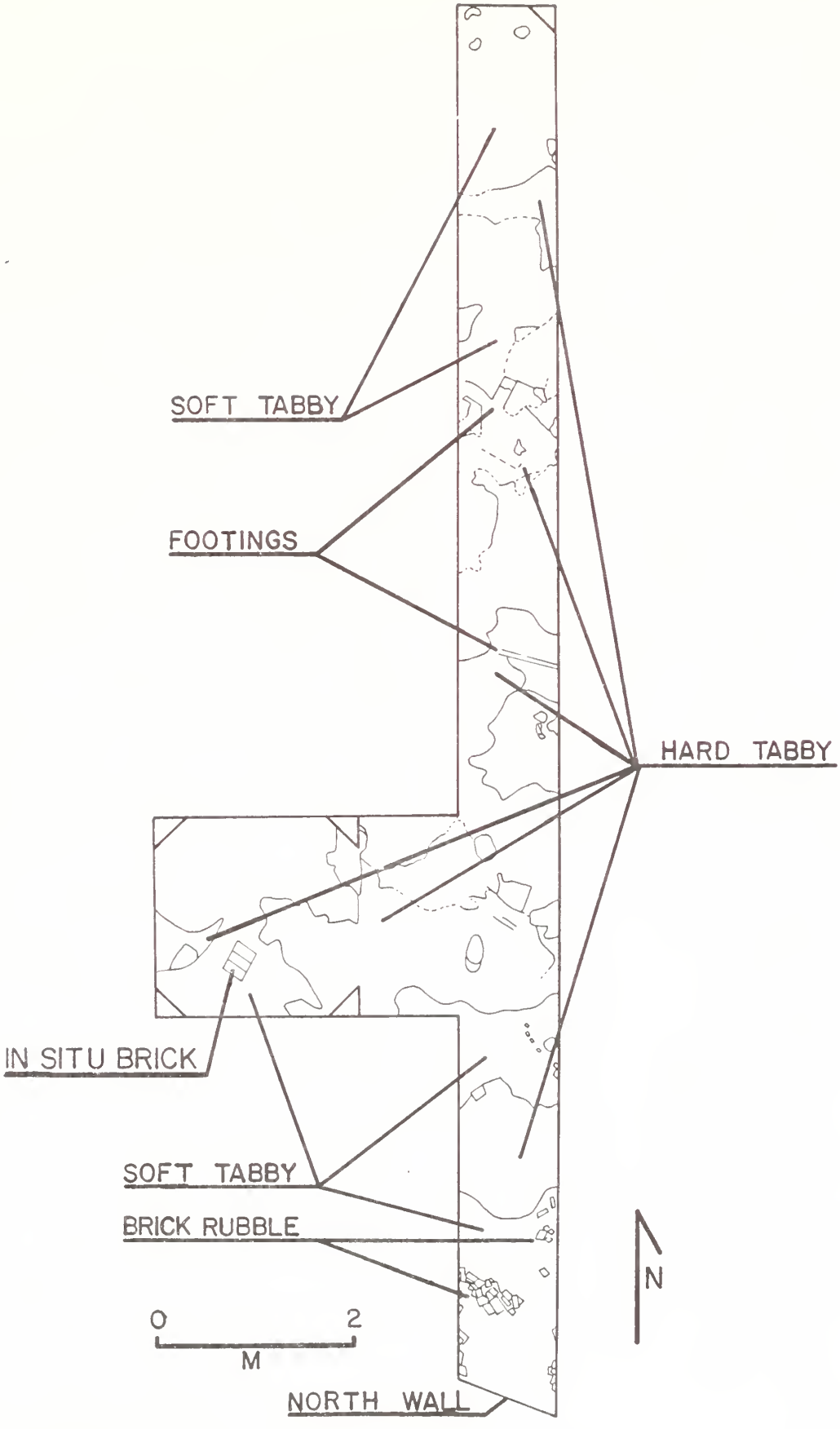


Figure 21. North of the Mill Room, Plan View.

it could be determined that the tabby floor was put directly on the existing ground surface (4.51m MSL). Four cut nails were recovered from the builder's-trench. Along with them 38g of wood charcoal were found.

On top of the tabby floor several locations were identified where brick footings for a ramp may have been located. Nearest to the wall (6m. or 19.5'), three whole bricks were located. They were mortared together and laying on their sides. Next to them is a finished edge on the tabby floor. It looks as if they had fallen over and, when upright, were fitted to the tabby edge. The second candidate for a ramp support is located 13.2m (43.3') from the wall. Here mortar scars on the tabby floor indicate that bricks had been attached to it (figure 22). Between these two features a mortar lip or ridge was exposed (7.5m or 24.6'). No brick scars were associated with it.

Artifacts collected from the excavation were limited to a few cut nails and whiteware ceramics. The nails (51) did not extend more than 6m from the building and they were not evenly distributed; 79% were within 2m of the building, 1% was in the 2m to 4m range and the others were between 4m and 6m out. The whiteware (in figure 13) came from this last area. Four fragments were recovered: two were blue shell-edged; one was a plain plate and had a foot; the last was also from a plate and was plain.

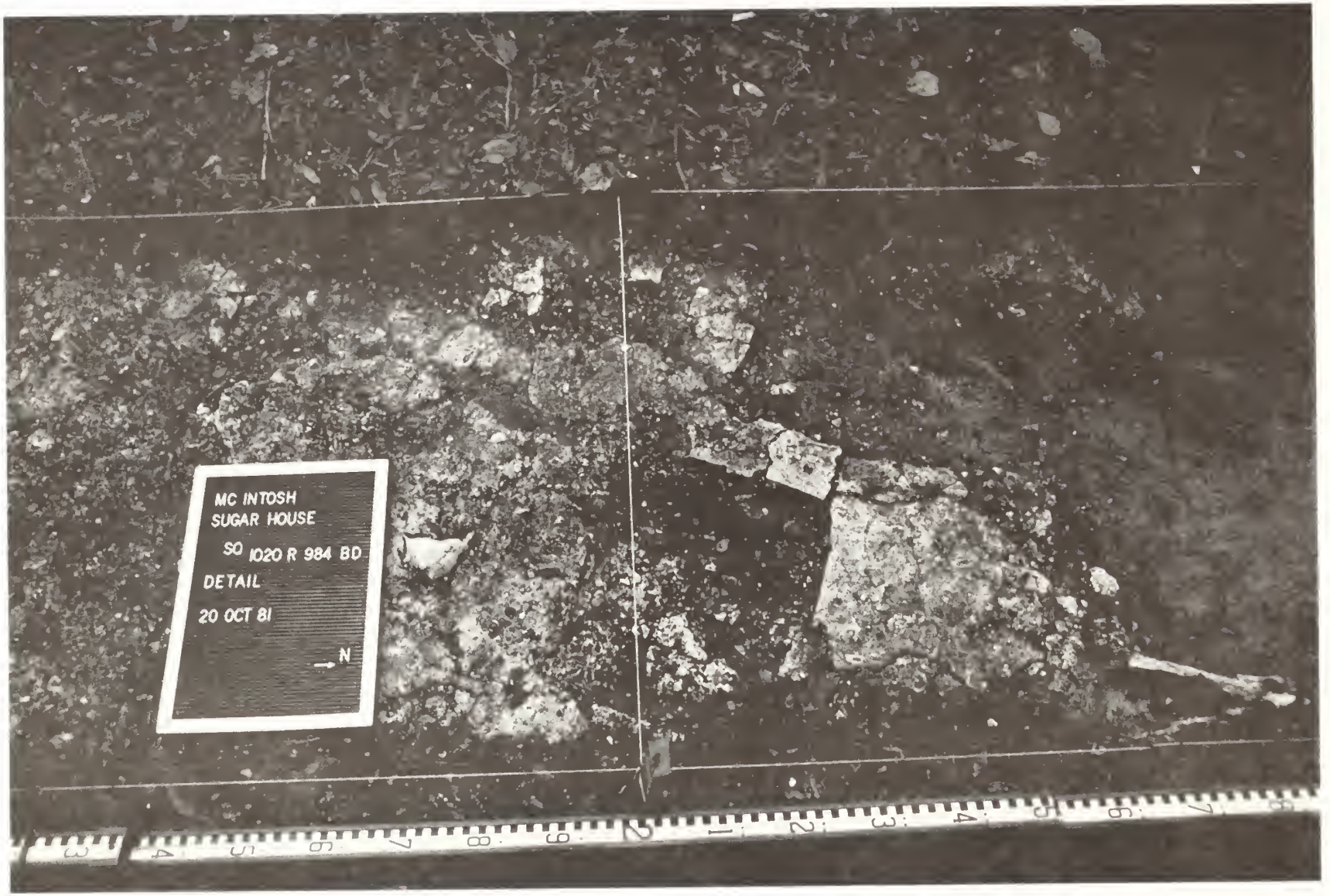


Figure 22. Possible Ramp Support, Plan View.

CHAPTER IV

CONCLUSIONS, INTERPRETATION, AND SITE MANAGEMENT

The intensive arhcaeological testing program at the John Houstoun McIntosh Sugarhouse has provided a great deal of information from which the nature and significance of the site can be established. With this data the construction details of the building can be understood in the context of architecture, industrial use, and human behavior. The study provides insight regarding the actual operation of sugarhouses, and the intellectual adventure of nineteenth century industrialization.

Historical archaeology has developed through the years in several ways. Its early concerns were frequently no more involved than documenting major historic buildings and monuments. From there, the concerns turned to more focused studies of domestic structures and the patterning of activities at the sites. Today, historical archaeology continues to address the understanding of domestic behavior and looks beyond this behavior to a fuller understanding of the lives of the involved peoples. In so doing, it is attempting to understand not only modes of production and reproduction, domestic and political organization, but the behavioral and mental processes that shape human development.

Through this kind of research our understanding of human

history can be improved. We can see behind the great individuals and events of history to social and cultural factors that affect daily life. We can also make comparisons between these factors and responses to them through time and between different socio-cultural groups. Understanding human history in this way tells us how past peoples lived their lives, how they responded to demographic, technological, economic, and environmental pressures and how their successes and mistakes were handled.

The McIntosh Sugarhouse provided a look into the past at a time when American culture was grappling with the pressures of political development in a new nation, expansion into a changing world economy, industrial revolution through new technologies, and the intellectual and moral question of slavery. It is a standing example of individual and social response to a demo-techno-econo-environmental conjunction of factors and events that affected the specific situation in Georgia and the general situation in the southern United States before the Civil War. The site is significant to understanding the events of the nineteenth century in coastal Georgia, the state, and the nation.

Archaeological Interpretation

Because there were only a few artifacts from which to interpret personal and domestic activity at the sugarhouse, most of what can be known about the site is related to its construction and

use. Therefore, each area suggested by the activity model will be discussed in terms of social history and architecture. To the extent that the organization of infrastructure, structure and superstructure determine the design and operation of the sugarhouse, interpretation of the site will be guided by them.

Milling Activity

Before sugar cane can be milled it must be brought to the sugarhouse, unloaded, and prepared for the mill. In general, the months that the sugarhouse would have operated are the wet months on the Georgia coast. This being the case, it would have been likely that efforts would have been taken to minimize soil erosion from heavily loaded carts or wagons. Given the abundance of shell in the region for making tabby, it would not be unreasonable to construct a tabby floor on which to park and unload the carts. The tabby pavement north of the mill room could have served this function. If the cane arrived at the mill at a rate greater than the rate the mill could process it, the paved area could have been used to store the incoming cane. In so doing, the cane would stay cleaner, and fewer impurities such as sand would end up in the cane juice.

Where the cane was taken into the building is not known. If the assumption is correct that the cane was stored on the north pavement before processing, it would be likely that the cane would be carried through the north mill room door or passed through one of the

two large north windows. Logistically, getting the cane to the mill had to be efficient and not interfere with other activity.

Remembering that the only exterior access to the second story of the mill room was also from the north side of the building, it would have been necessary to keep that access clear. A ramp to that door would have presented a substantial architectural barrier to activity in the area. Next to the wall the ramp would have to be 2.13 m high to reach the door. Archaeological evidence indicates that the ramp was about 13.2m long, giving the ramp a slope of 15 degrees.

Burning baggasse to fuel the boiling train was standard practice by the nineteenth century. Therefore, it seems probable that the baggasse was removed from the north side of the mill room. Bringing it out this side would provide the shortest path to the furnace.

Therefore, three activities may have been associated with the paved area north of the mill room. First, unloading the cane as it comes in from the fields; second, moving animals up to and back down from the second floor; and third, removing the baggasse to the furnace. If all of these activities occurred on the pavement, it is probable that the cane was passed into the mill room through a window toward the west side of the area. The architectural barrier of the ramp would define the eastern limit of that activity. On the east side of the ramp, the baggasse could have been passed out the other window or through the doorway.

It should be pointed out that the cane could have entered the mill room through the south door and windows or through the west windows. The scope of the present research did not permit excavation in all of these areas. Future archaeological investigations at the site should consider methods to answer this question.

Archaeology in the mill room located a thin tabby floor at ground level. Because of root damage to the floor it was not possible to define the size and placement of the mill or structural supports for the second story floor. The thickness of the floor would suggest that it was not intended to bear weight. Its function is thought to have been to aid in keeping the room free of soil and dust that might contaminate the cane juice. Additionally, working on a paved level floor would have advantages over a dirt floor.

Certain finished edges in the tabby floor may represent footings for the mill. Without extensive excavation in the mill room this can not be confirmed. To undertake such excavation would require removal of the large oak tree in a manner that would not damage the building or the archaeology.

Boiling Activity

The construction of the boiling room and its attendant facilities is perhaps the most interesting aspect of the McIntosh sugarhouse. Not only does it provide direct evidence of the boiling operation, it presents a unique opportunity to understand the experimental nature of sugar manufacturing in the 1820s and 1830s.

The archaeology tells us that one set of boiling kettles was placed along the north wall of the room. The train was most likely sitting in a flue made from Savannah gray brick and flashed around the kettles or pans with thin iron sheet metal. The flue extends between the furnace (in the northeast corner of the room) and the chimney (located in the southwest corner of the north porch).

The furnace was also constructed from Savannah brick and lined with "Berry's" fire brick. It opened onto the north porch where a service pit was constructed to load the fire box and remove spent fuel. This service area was defined by two tabby retaining walls and two building walls. The area is not a cistern as suggested by Floyd.

Openings were created in the north wall of the boiling room to service the furnace and connect the flue with the chimney. In order to accommodate the openings, the north wall was constructed differently from all other walls in the building except the south wall of the same room. In the lower portion of these two walls, wooden forms, both vertical and horizontal, were left in place when the tabby for the walls was poured (figure 23). This resulted in the creation of individual tabby blocks that could be removed from the walls.

This special wall construction suggests two related interpretations for the setup of the boiling room. First, that the construction of the boiling and curing rooms preceded final plans for the configuration of the furnace, boiling train and chimney; and second, that the output of the mill or size of the crop had not been

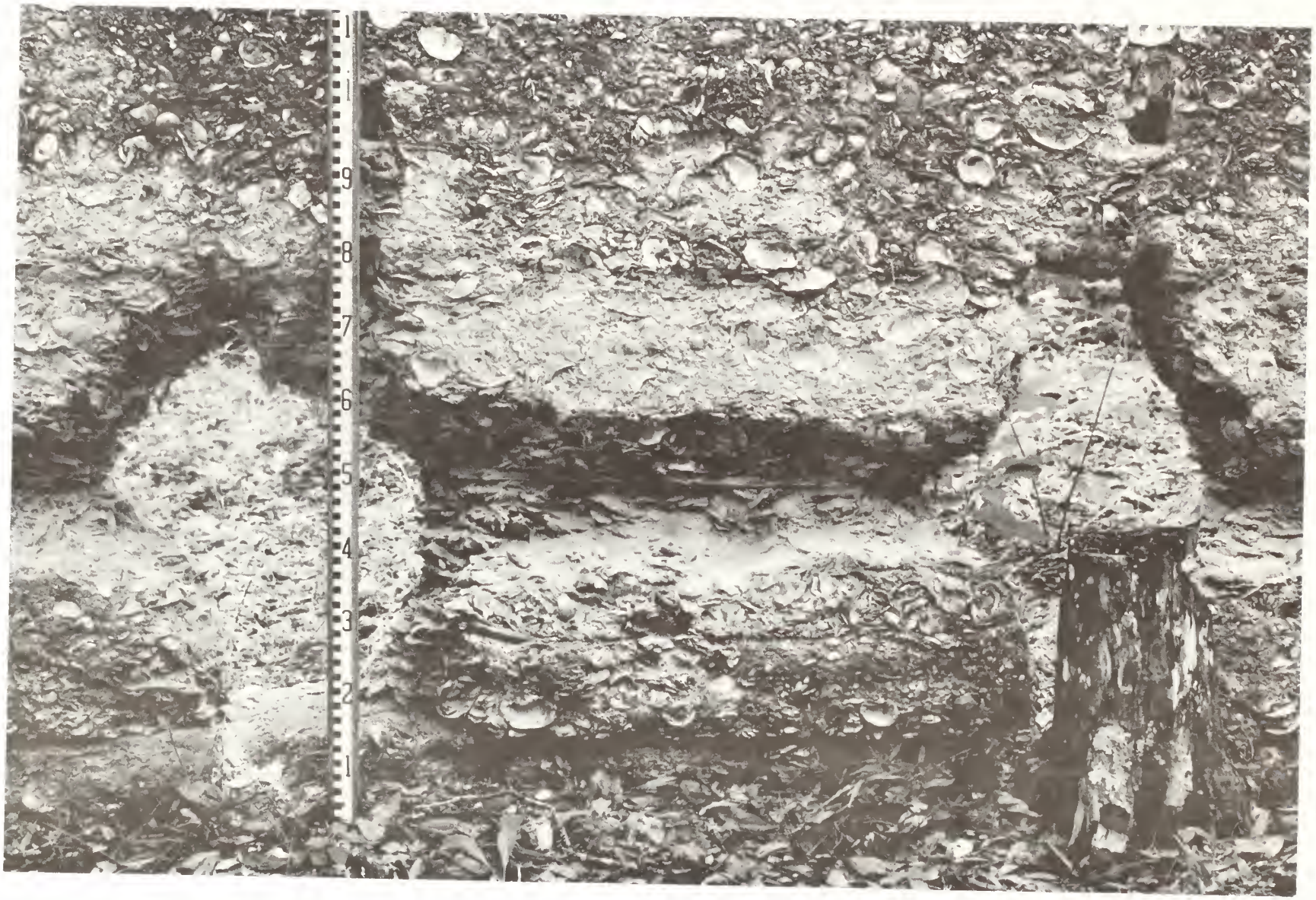


Figure 23. Boiling Room Wall Construction.

established at the time the building was begun. If output turned out to be greater than what could be accommodated by one boiling train, another could be added with a simple modification to the building. Also, if the crop grew well and the sugar market remained strong or improved, McIntosh could expand his cane fields and process the additional cane without the need to build a second sugarhouse or undertake substantial construction to enlarge the current building.

The practicality of the special wall construction can be understood when one considers the difficulty involved in altering a solid tabby wall. The consistency of the sugarhouse tabby is not substantially different from that of modern reinforced concrete. To make a new opening in one of the walls would require considerable effort with a sledge, and could threaten the structural stability of the wall by fracturing the surrounding tabby. Unfortunately, since the sugarhouse was abandoned, water has soaked into the wood-lined joints and weakened the tabby. It is expected that the north wall of the boiling room will require rehabilitation if the wall is to be preserved.

The actual purpose of the brick work on the south side of the boiling room can not be determined. It is thought that it may be the base of a clarification vat. It could be associated with the starch manufacturing reported during the time Hallowes owned and operated the sugarhouse. It is not anticipated that further archaeology in the boiling room will answer the question of function of the brick work.

Curing Activity

The archaeological investigation of the curing room suggests that the room was little more than a warehouse for the curing and finished sugar. The raised areas at the north and south ends of the room served as storage, while the lower center area was probably used to drain off any molasses that remained after crystallization. The low center section of the room may have aided in getting the cane syrup from the boiling train, but no evidence for this was found.

Because the finished sugar was hauled to St. Marys for shipping, it is suspected that the height of the floor in the north and south ends of the curing room was established to ease the loading of the sugar into wagons. The excavation outside the south door confirmed that wagons had been parked at the door.

General Comments

From the results of the intensive archaeological testing and detailed examination of the ruins, the nature of the McIntosh sugarhouse can be characterized. A two room building was constructed from tabby. The walls were set in a builder's-trench below ground level. No footings were placed under the walls; they rested on sterile soil.

The tabby walls of the two room structure were poured into a continuous form. In the west room, the north and south walls were constructed with wooden joints that defined blocks of tabby that could be removed to create openings for two furnaces and two chimney flues.

The east room was divided into three sections, two raised areas at the north and south ends of the room and a lowered central area. The central area was separated from the other areas by two tabby footings that supported a wooden floor over the end sections. These wood floors were installed as the tabby walls were poured. Slots are present where floor beams and joists fit into the building and footing walls.

After the two room building was completed, a third room was added to the west side. This third room was added to house the sugar mill and is the only two story room at the sugarhouse. The floor for the second story was not installed as the tabby walls were poured. This deviation (the separate construction of the room and the lack of wall-fitted second story floor beams and joists) in the construction pattern suggests that McIntosh began building the sugarhouse before he had purchased or received his iron horizontal roller mill. It is conceivable that the room may have been constructed around the mill. The bases of all building walls excavated ranged between 4.11m MSL and 4.62m MSL, a total difference of just .51m (1.67').

To finished building walls several modifications were made. First, two holes were cut in the east wall of the mill room to provide partial support for the second story floor. Second, a hole was made in the north wall of the boiling room to provide a service opening for the furnace. When this opening was installed and the service pit excavated, several courses of brick were placed under the wall to stabilize its base. Also, the tabby retaining wall on the east side

of the service pit was probably added to the base of the adjacent building wall. Two other retaining walls were added to finish the service pit. The third major modification to the building involved making another opening in the north building wall of the boiling room. This opening was necessary to lead the chimney flue through the wall to the chimney.

Tabby floors were added to the mill and boiling rooms. The floor in the mill room was relatively thin and probably not designed to support the weight of the milling machine. The tabby floor between the east and west doors of the boiling room was probably installed to tend the boiling train. It did not extend south to the brick vat. There was what appeared to be a sand and mortar floor in the center area of the curing room.

Outside the sugarhouse a wood lined box well was dug near the north east corner of the building. It was excavated to the level of the present water table. At that depth no artifacts were located that might have fallen into the well when it was in use.

Excavation indicated that it was unlikely that the south porch was used during the time the sugarhouse was in operation. This is in stark contrast to the activity that occurred on the north porch.

All indications are that the sugarhouse was gutted at the time of its abandonment. No artifacts were located that can be identified with milling machinery or the boiling equipment. The large quantity of well-preserved cut nails suggests that the wooden elements of the

building burned after the equipment and brick work were salvaged. Further, the wooden elements of the well may have burned at the same time the wood in the sugarhouse burned. After that the well was filled through erosion and dumping.

Site Significance

The John Houstoun McIntosh Sugarhouse and Archaeological Area provides significant insight into southern history just before the Civil War. It is important, not only for the information represented by the architecture and archaeology, but because it can be seen and understood by site visitors who have a minimal background in history and anthropology. The site visitor can learn about sugar making, the role sugar played in nineteenth century plantation economy, the nature of an evolving technology, and the intellectual endeavor of planning and executing the construction of a building that could be quickly and efficiently altered with changing needs.

The McIntosh sugarhouse is also important because it stands for a much larger enterprise. It is one attempt to cope with demographic, technological, economic and environmental pressures acting throughout the Southern United States. Therefore, the site significance can be understood at a local level of interpretation, at the state level and to anyone attempting to understand the South before abolition. This last level of significance is the most important because it extends beyond the general issue of slavery to a

partial understanding of the fundamental socio-cultural problems leading to the Civil War.

Site Visitor Plan

Visitors to the McIntosh Sugarhouse site should find their visit interesting and informative at several levels. First, they should be able to experience the historic ambience presented by the ruined tabby walls and surrounding natural areas. Secondly, the visitor should be provided sufficient information to tour the ruins and understand the historic background of the site. Thirdly, park personnel should make available guided tours that offer specialized instruction regarding the ecological situation at the site, the history of plantation economy, the technology of sugar manufacturing, the activity areas at the site, and the factors involved in abandoning large scale sugar production in the Georgia Coastal area.

Given the character of the site it is not recommended that large interpretive exhibits be constructed at the sugarhouse. Instead, small signs or exhibits that have a minimal intrusive impact should be employed if any such interpretative devices are installed on site. Ideally a brochure with a site map and interpretive narrative could be developed for visitor use. Even though a brochure might provide a litter problem at the site, the benefits derived by maintaining the ruins in a natural state may outweigh the cost of regular clean-up at the site.

Tours of the site, either self-guided or with a guide provided by the park, should begin at the area north of the mill room. If a new path is constructed to bring the visitors from the new parking lot through the woods, signs could be spaced along the trail that describe the ecological setting of the sugarhouse. Also, descriptions of cane planting, tending, and harvesting could be used to begin the interpretation of the sugarhouse.

At the area north of the mill room general background information regarding John Houstoun McIntosh's involvement in sugar production should be brought to the attention of the site visitor. A brief discussion of the technology involved in sugar manufacturing, as well as the activites associated with bringing the cane in from the fields should occur.

From this area, site visitors would proceed into the mill room. Interpretation of the mill room should include a discussion about milling technology and the shift from animal to steam powered mills. From that discussion the slotted windows and second story door can be explained. Then, while the visitor's attention is focused on the tabby walls, a description of tabby construction could occur, pointing out the nature of the tabby, the form type building, and the fact that the mill room was constructed separately from the rest of the building.

When the visitor moves from the mill room to the boiling room, discussion of tabby construction should continue by noting

specialized treatment of the north and south walls of that room. Then a detailed description of the boiling room activity should be presented. An effort should be made to relate the north porch activity areas (service pit and chimney) with those of the boiling room (furnace and boiling pans). Also a discussion of the reported patent McIntosh received for clarifying the cane juice would be appropriate to the interpretation of this room.

The curing room can be discussed briefly, pointing out the two areas where wood floors had been installed at the time the tabby walls were constructed. While pointing out the loading dock doors the guide can remind the visitor of the factors involved in plantation economy.

Once the visitor moves back out of the ruins, a summary of the demographic, technological, economic and environmental relationships of the site, plantation, and market could conclude the interpretation of the ruins. Also, the location of the well, lack of evidence for use of the south porch, etc., could be presented as part of the summary.

Management Recommendations

Management recommendations that can be made for the McIntosh sugarhouse fall into two classes. They are the deterioration of the ruins and archaeological integrity of the site through natural processes and the destruction of the ruins and archaeology by site

visitors.

With regard to natural actions the following recommendations are made:

1. Removal of all trees and other plants growing on top of the walls. This should reduce destruction of the tabby by root action and plant related chemical erosion. Once the plants are removed, any effort to cap the walls should be accomplished only after the capping material has been matched to the structural properties of the tabby.
2. Removal of all trees and shrubs inside and near the ruins. Beyond the potential for these trees falling and destroying the walls, root action has created severe damage to the archaeological component of the site. When the trees and shrubs are removed, they should be cut near the ground with the stumps and root systems allowed to decay naturally. A licensed forester should be consulted to select the trees for removal and the best methods for their actual removal.
3. Measured drawings of the ruins should be completed at the earliest possible convenience. These drawings should be accomplished to document the ruins as they exist today and to document further deterioration of tabby (see appendix).

4. Careful monitoring of the lower portions of the north and south walls in the boiling room should determine the general stability of these eroding walls. If the erosion must be repaired, it is suggested that any repairs be textured to resemble the tabby, but not to the extent that the repair not be recognizable as a modern addition to the ruins.
5. Any effort to patch or cap the tabby walls should only occur if the chemical properties of the original tabby can be matched. A professional in building restoration should be consulted before any such activity proceeds.

For disturbances that result from site visitors, these recommendations are made:

1. Restrict motorized vehicles from the general area of the ruins. In the past, vehicles have inadvertently damaged the walls and archaeology at the site.
2. Close the site at sunset. Studies have shown that major vandalization of historic ruins occurs at night.
3. Prohibit climbing on the ruins.
4. Construct wooden stairs or ramps over the door sills to reduce erosion from continued stepping and standing on them. Construction of such devices should be

designed to provide as little visual impact as possible.

5. Move the picnic tables away from the ruins and provide adequate trash containers to keep site litter to a minimum.
6. Request cooperation between local, state and Navy law enforcement officials to monitor activity at the site.

The McIntosh sugarhouse is a most important cultural resource that can be appreciated and enjoyed by site visitors from around the nation. At the time archaeological testing was conducted, the archaeological component of the site was in remarkably good condition. It is hoped that the ruins and archaeology at the site continue to exist in their present, or improved, condition for future visitors and researchers alike.

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APPENDIX

Measured Drawings with Recommendations for Stabilization

of the John McIntosh Tabby Sugar Mill [1]

Lee Meyer
Architect

Brad T. Smith
Project Director

Photography and Graphics

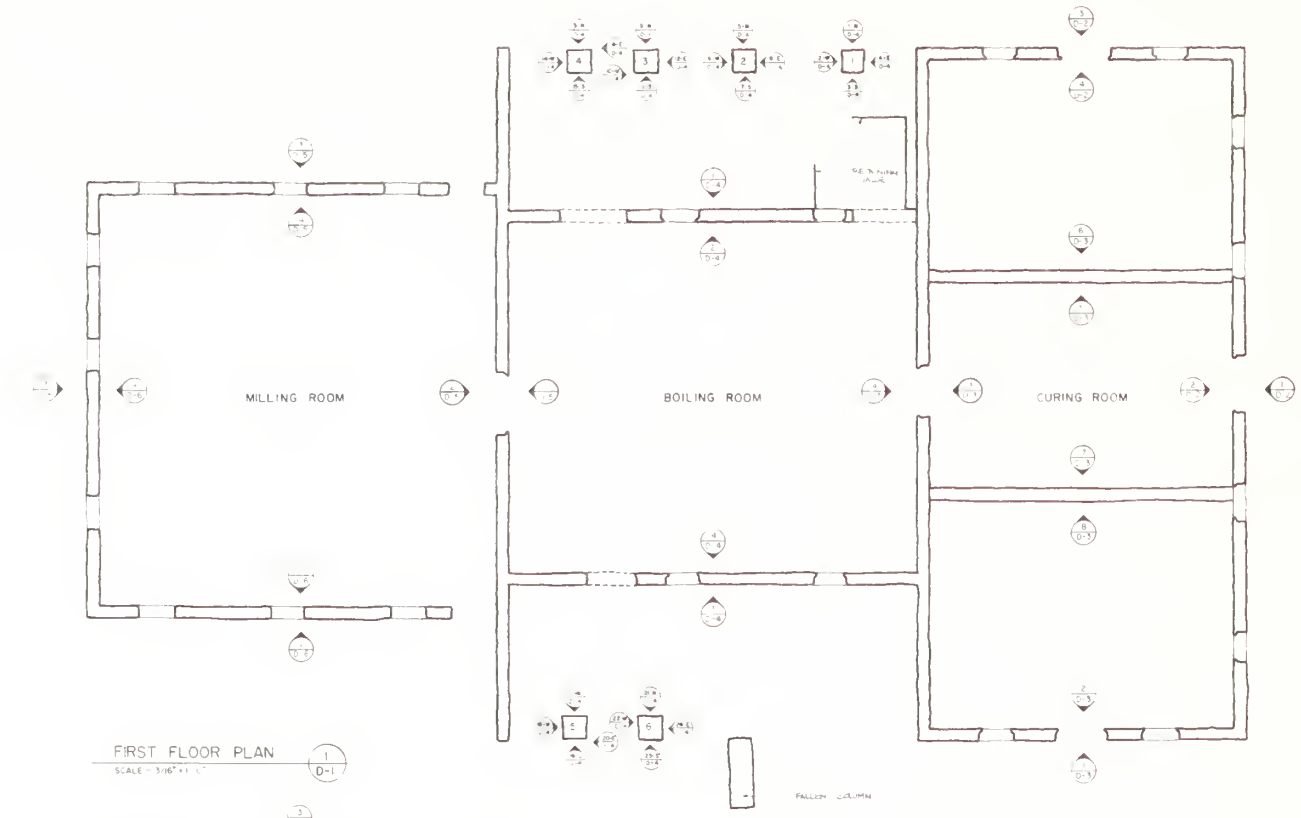
Michael Day

Graphics

Tia Jones

1984

[1]Smith, Brad T., Lee Meyer, Michael Day, and Tia Jones
1985 Project Manual for John McIntosh Tabby Sugar Mill Ruin.
Camden County Recreation & Parks Department, Camden County, Ga.
and Lee Meyer Associates, Savannah, Ga.



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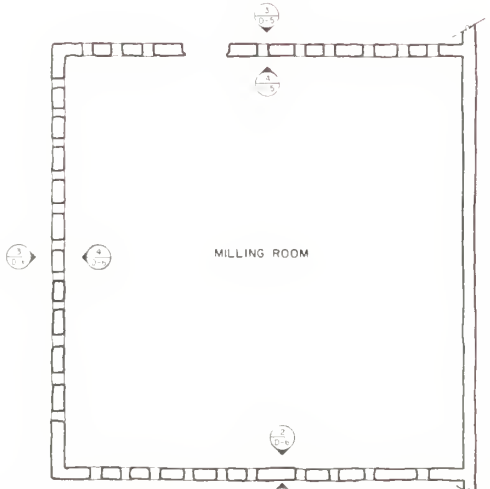

SECOND FLOOR PLAN
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SCALE 3/16"

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MC INTOSH SUGAR WORKS
CAMDEN COUNTY GA
project

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lee meyer
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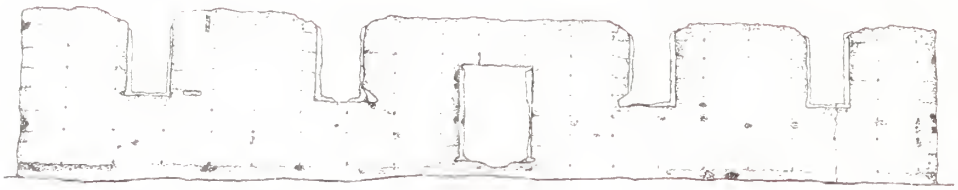
217 E. Huntingdon ... fax ... Savannah, Ga. 31402



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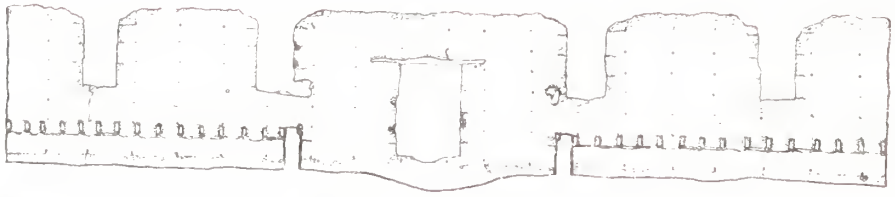

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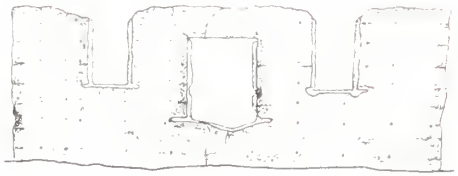

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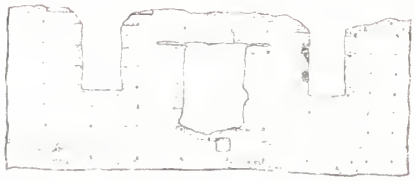

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NOTE THESE DRAWINGS WERE PREPARED FROM RECTIFIED PHOTOGRAPHS

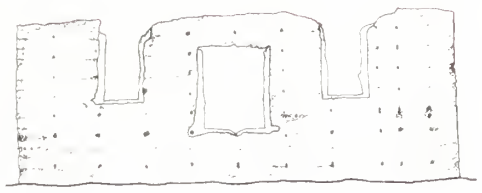
ELEVATIONS-DOCUMENTATION

MC INTOSH SUGAR WORKS
CAMDEN COUNTY GA

Sheet 2

2 of

lee meyer
and associates
architects and planners



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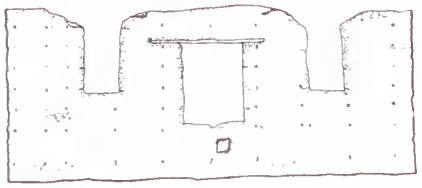

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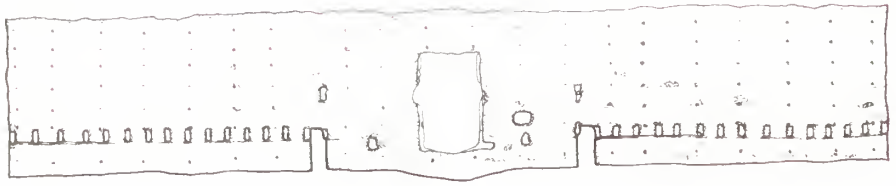

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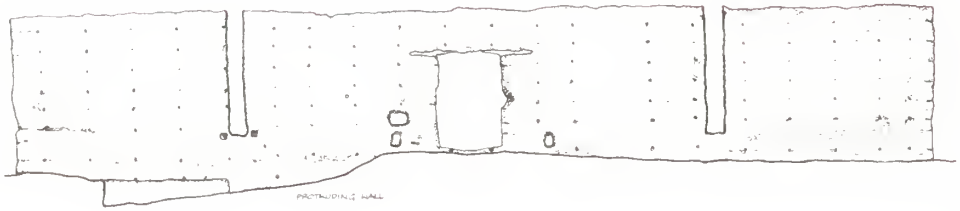

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NOTE THESE DRAWINGS WERE PREPARED FROM RECTIFIED PHOTOGRAPHS

SCALE: 1" = 4'

ELEVATIONS–DOCUMENTATION (sheet title)			sheet 3
MC INTOSH SUGAR WORKS CAMDEN COUNTY, GA (project)			
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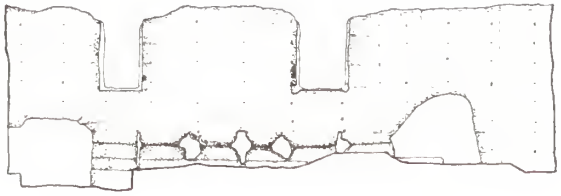
27 E. Huntingdon St. P.O. Box 73 Savannah, Ga. 402



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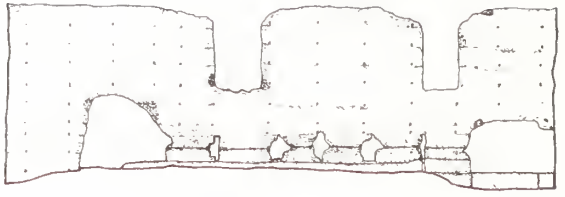

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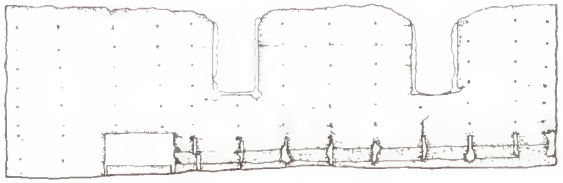

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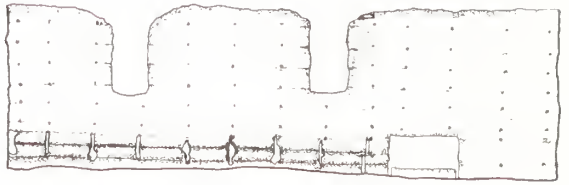

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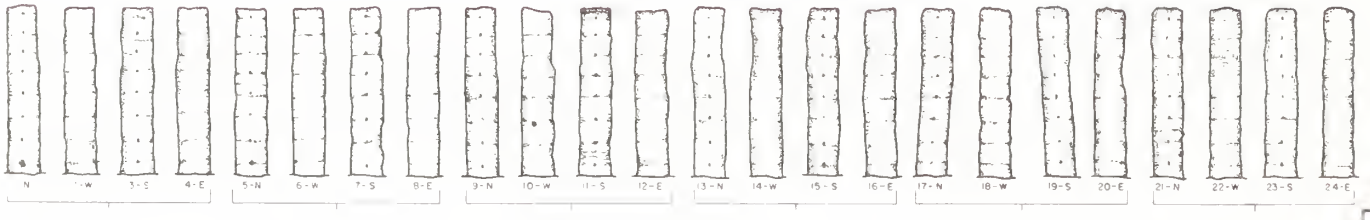

COLUMN - 1 COLUMN - 2 COLUMN - 3 COLUMN - 4 COLUMN - 5 COLUMN - 6

NOTE THESE DRAWINGS WERE PREPARED FROM RECTIFIED PHOTOGRAPHS

ELEVATIONS-DOCUMENTATION

sheet title

MC INTOSH SUGAR WORKS
CAMDEN COUNTY, GA

project

sheet 4

MD drawn | BTS checked | NOV 84 date

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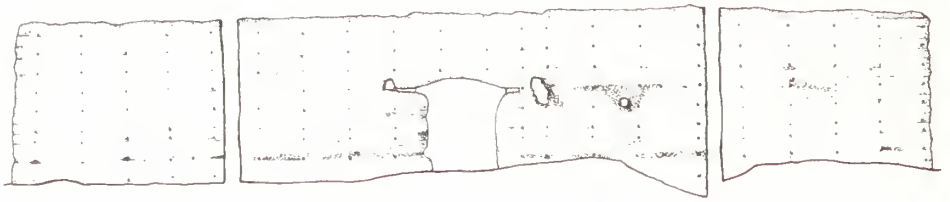

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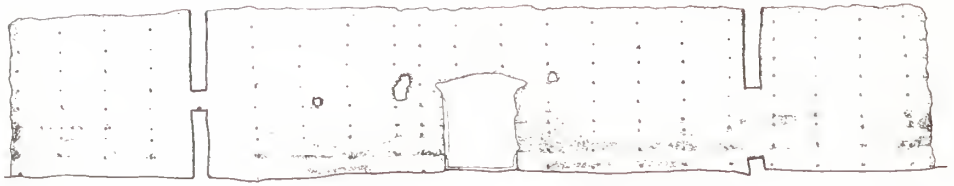

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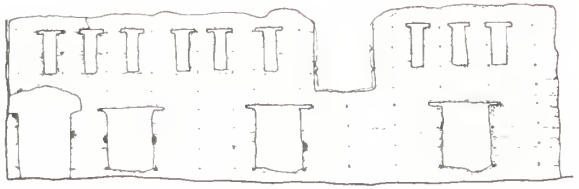

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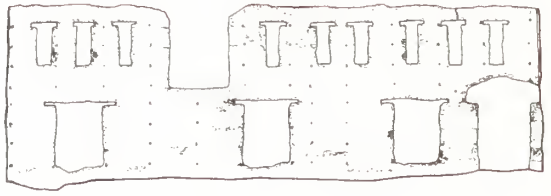

N WALL – INT (MILLING RM) 4/D-5

NOTE THESE DRAWINGS WERE PREPARED FROM RECTIFIED PHOTOGRAPHS

ELEVATIONS-DOCUMENTATION
sheet title

MC INTOSH SUGAR WORKS
CAMDEN COUNTY, GA
project

sheet 5

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drawn	checked	date

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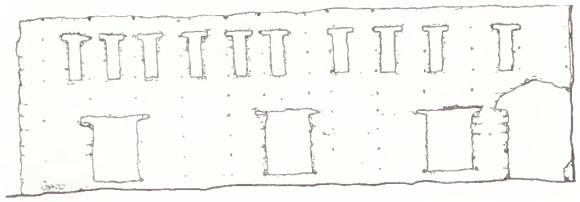

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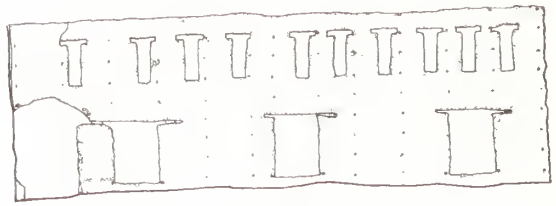

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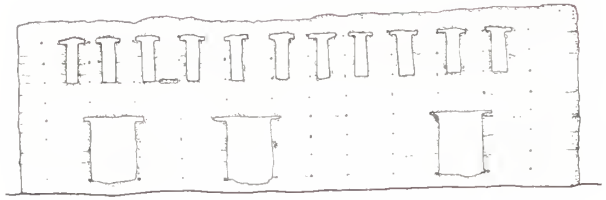

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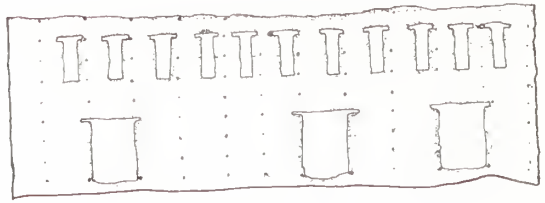

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NOTE: THESE DRAWINGS WERE PREPARED FROM RECTIFIED PHOTOGRAPHS

ELEVATIONS-DOCUMENTATION (sheet title)			sheet 6
MC INTOSH SUGAR WORKS CAMDEN COUNTY, GA (project)			
MD (drawn)	BTS (checked)	NOV 84 (date)	6 of 5

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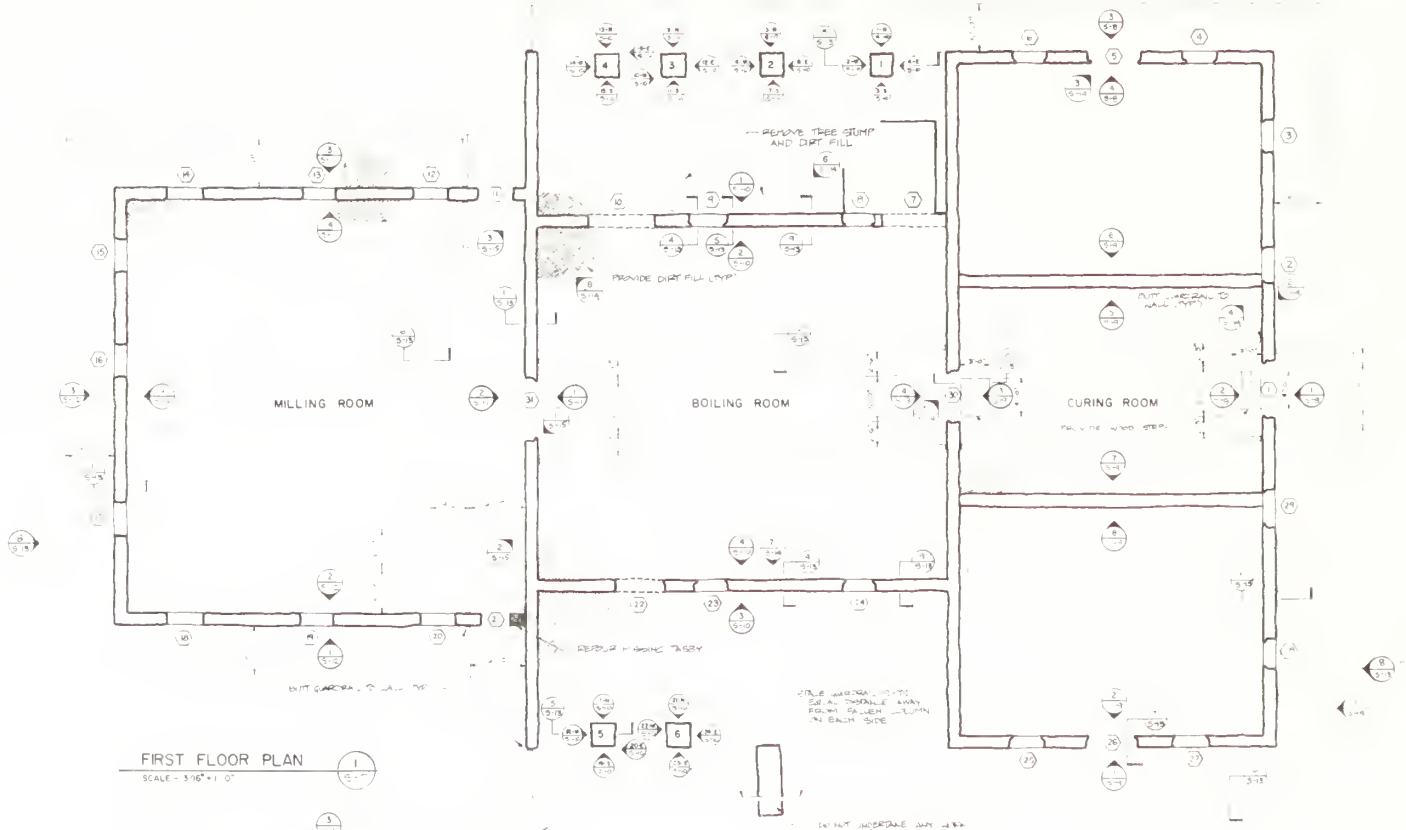
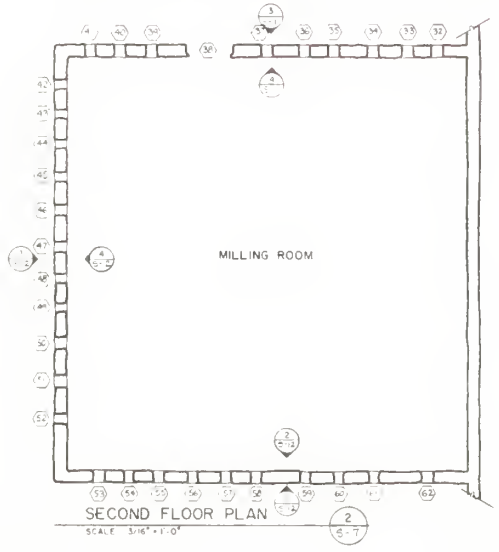


FIRST FLOOR PLAN
SCALE - 3/16" = 1'-0"



SECOND FLOOR PLAN
SCALE 3/16" = 1'-0"

GENERAL NOTES

1. REMOVE ALL TREE LIMBS AND TRASH FROM THE INTERIOR OF THE RUIN AND WITHIN 5' OF ANY EXTERIOR WALL
2. ON THE NORTH SIDE OF THE NORTH BOILING ROOM WALL REMOVE THE TWO TREE STUMPS AND DIRT FILL NEXT TO THE WALL. CUT THE STUMPS FLUSH WITH THE ADJACENT GROUND LEVEL. DO NOT PULL OR EXCAVATE OR DO ANYTHING TO DISTURB THE GROUND. LEVEL THE GROUND TO CORRESPOND WITH THE ADJACENT GROUND LEVEL
3. PROVIDE DIRT FILL IN AREAS INDICATED FROM AN OFF SITE SOURCE. MATCH SOIL TYPE FOUND ON SITE. MATCH LEVEL OF SURROUNDING GROUND AND PROVIDE A PROTECTIVE SLOPE SEE SPECS
4. REPOUR AREAS OF MISSING TABBY WHERE INDICATED. MATCH ORIGINAL TABBY IN COLOR, TEXTURE, COMPOSITION AND POURING METHOD. SEE SHEET 13 FOR DETAILS AND SPECS
5. PROVIDE WOOD HANDRAIL AS SHOWN. SEE SHEET 13 FOR DETAILS. THIS IS AN ALTERNATE
6. PROVIDE WOOD STEPS AS SHOWN. SEE SHEET 13 FOR DETAILS

LEGEND

- PROVIDE DIRT FILL
- REMOVE TREE STUMP AND DIRT FILL
- PROVIDE WOOD HANDRAIL
- REPOUR MISSING TABBY
- OPENING NUMBER

SCALE 3/16" = 1'-0"

FL PLANS-STABILIZATION
sheet title

MC INTOSH SUGAR WORKS
CAMDEN COUNTY, GA
project

sheet 7

MD drawn | RTS checked | DEC 84 date

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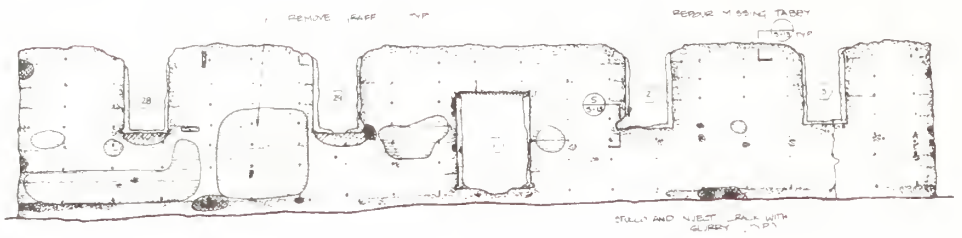
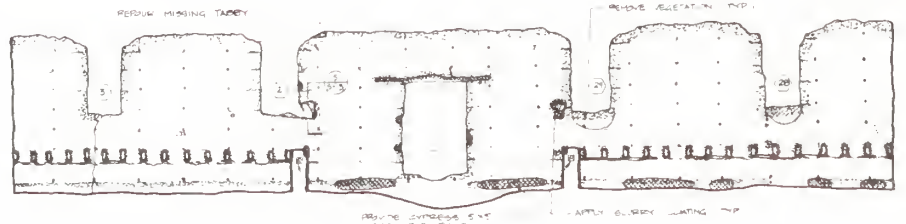
LEGEND

- REMOVE VEGETATION
- APPLY SLURRY COATING
- REMOVE GRAFFITI
- REPAIR MISSING TABBY
- PROVIDE CYPRESS LINTEL
- OPENING NUMBER



E. WALL – EXT. (CURING RM.) 1 S-8



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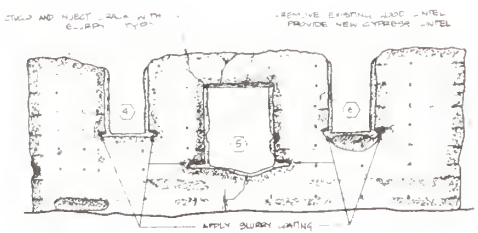

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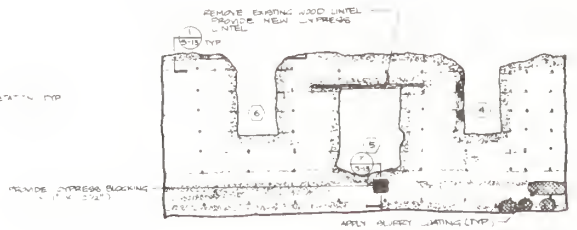

N. WALL – INT. (CURING RM.) 4 S-8

16 NEAR THE TOP OF THE LOW WALLS INSERT A SPECIALLY CUT CYPRESS 5" X 5" INTO THE EXISTING HOLES. WHERE ACCESSIBLE APPLY SLURRY COATING TO ALL TABBY SURFACES BEFORE INSERTION AND STUCCO AND INJECT SLURRY COATING INTO CRACKS BETWEEN TABBY AND 5" X 5" AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW 5" X 5". SEE DRAWINGS FOR REQUIRED LENGTHS. FIELD VERIFY DIMENSIONS. 5" X 5" MAY HAVE TO BE CUT INTO SHORTER LENGTHS THAN INDICATED IN ORDER TO GET IT INTO THE HOLES. SEE SPECS.

1. REMOVE ALL DEAD AND LIVE VEGETATION FROM TOPS OF WALLS AND COLUMNS AND WINDOW AND DOOR SILLS. IF REMOVING ANY ROOT WOULD CAUSE THE REMOVAL OF A LARGE PORTION OF THE TABBY, CUT THE ROOT OFF FLUSH WITH THE TOP OF THE WALL. SEE SPECS.

2. REMOVE ALL DEAD AND LIVE VEGETATION (ESPECIALLY MOSS, LICHEN AND VINES) FROM ALL WALL SURFACES. THIS GENERALLY OCCURS NEAR THE TOPS OF THE WALLS NEAR THE GROUND AND BELOW WINDOW AND DOOR SILLS. SEE SPECS.

3. ON THE TOP OF ALL HIGH WALLS AND COLUMNS, REMOVE ALL LOOSE AND UNSOUND TABBY DOWN TO A SOUND SURFACE. APPLY A LIME-BASED STUCCO AND SLOPE AS SHOWN IN DETAILS 1/S 13, 2/S 13 AND 3/S 13. BLEND STUCCO INTO TABBY AT EDGES. SEE SPECS.

4. ON THE TOP OF ALL WINDOW AND DOOR SILLS (EXCEPT OPENINGS 30 AND 31) AND THE LOW WALLS, APPLY A LIME BASED SLURRY COATING 1/8" THICK. BLEND COATING INTO TABBY AT EDGES. SEE SPECS.

5. ON THE TOP OF THE SILLS OF OPENINGS 30 AND 31, PROVIDE A 1/2" THICK LIME BASED STUCCO. MAKE SMOOTH AND FOLLOW CONTOURS OF SILL. SEE SPECS.

6. WHERE INDICATED, APPLY A LIME BASED SLURRY COATING AT ALL LINTELS AND OTHER SURFACES ABOVE OPENINGS. MAKE IT 1/8" THICK. CARRY IT FROM JAMB TO JAMB AND BLEND WITH TABBY AT EDGES. SEE SPECS.

7. WHERE INDICATED, APPLY A 1/8" THICK LIME BASED SLURRY COATING TO ALL WALL SURFACES WHERE THE TABBY BINDER IS DETERIORATING. DETERIORATING TABBY CAN BE IDENTIFIED BY ITS SOFTNESS AND THE PROTRUSION OF A LOT OF SHELLS. BLEND COATING WITH SOUND TABBY AT THE EDGES. SEE SPECS.

8. STUCCO AND INJECT ALL CRACKS WITH A LIME BASED SLURRY. FINISH OFF FLUSH WITH THE EXISTING TABBY SURFACE. SEE SPECS.

9. CLEAN ALL DARK AREAS UNDER WINDOW SILLS. SEE SPECS.

10. REMOVE ALL SPIDER WEBS FROM THE WALLS. SEE SPECS.

11. REMOVE ALL TRASH, ROOTS AND OTHER VEGETATION FROM ALL TIE HOLES. SEE SPECS.

12. WHERE INDICATED, REMOVE GRAFFITI AS INDICATED IN THE SPECS.

13. PROVIDE CYPRESS LINTELS WHERE INDICATED. APPLY SLURRY COATING TO ALL TABBY SURFACES BEFORE INSERTION AND STUCCO AND INJECT SLURRY COATING INTO CRACKS BETWEEN TABBY AND LINTELS AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW LINTEL. SEE SPECS.

14. PROVIDE CYPRESS BLOCKING WHERE INDICATED. APPLY SLURRY COATING TO ALL TABBY SURFACES BEFORE INSERTION AND STUCCO AND INJECT SLURRY COATING IN TO CRACKS BETWEEN TABBY AND BLOCKING AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW BLOCKING. SEE SPECS.

15. REPAIR AREAS OF MISSING TABBY WHERE INDICATED. MATCH ORIGINAL TABBY IN COLOR, TEXTURE, COMPOSITION AND POURING METHOD. SEE SHEET 15 FOR DETAILS AND SPECS.

SCALE - 1/8"

ELEVATIONS- STABILIZATION (sheet title)

MC INTOSH SUGAR WORKS CAMDEN COUNTY, GA (project)

sheet 8

M.D. (drawn)	BTS (checked)	DEC. 84 (date)

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GENERAL NOTES

1. REMOVE ALL DEAD AND LIVE VEGETATION FROM TOPS OF WALLS AND COLUMNS AND WINDOW AND DOOR SILLS. IF REMOVING ANY ROOT WOULD CAUSE THE REMOVAL OF A LARGE PORTION OF THE TABBY, CUT THE ROOT OFF FLUSH WITH THE TOP OF THE WALL. SEE SPECS.

2. REMOVE ALL DEAD AND LIVE VEGETATION (ESPECIALLY MOSS, LICHEN AND VINES) FROM ALL WALL SURFACES. THIS GENERALLY OCCURS NEAR THE TOPS OF THE WALLS NEAR THE CHOTINO AND BELOW WINDOW AND DOOR SILLS. SEE SPECS.

3. ON THE TOP OF ALL HIGH WALLS AND COLUMNS, REMOVE ALL LOOSE AND UNSOUND TABBY DOWN TO A SOUND SURFACE. APPLY A LIME BASED STUCCO AND SLOPE AS SHOWN IN DETAILS 1 5-13, 15 13 AND 3-5 13. BLEND STUCCO INTO TABBY AT EDGES. SEE SPECS.

4. ON THE TOP OF ALL WINDOW AND DOOR SILLS (EXCEPT OPENINGS 1 30 AND 311) AND THE LOW WALLS, APPLY A LIME BASED SLURRY COATING 1/8" THICK. BLEND COATING INTO TABBY AT EDGES. SEE SPECS.

5. ON THE TOP OF THE SILLS OF OPENINGS 1 30 AND 31, PROVIDE A 1/2" THICK LIME BASED STUCCO. MAKE SMOOTH AND FOLLOW CONTOURS OF SILL. SEE SPECS.

6. WHERE INDICATED, APPLY A LIME BASED SLURRY COATING AT ALL LINTELS AND OTHER SURFACES ABOVE OPENINGS. MAKE IT 1/8" THICK. CARRY IT FROM JAMB TO JAMB AND BLEND WITH TABBY AT EDGES. SEE SPECS.

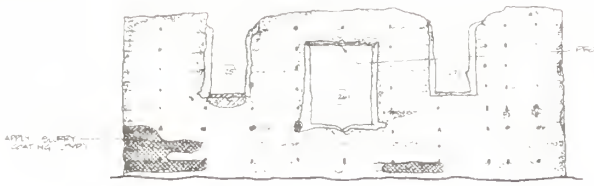
7. WHERE INDICATED, APPLY A 1/8" THICK LIME BASED SLURRY COATING TO ALL WALL SURFACES WHERE THE TABBY BINDER IS DETERIORATING. DETERIORATING TABBY CAN BE IDENTIFIED BY ITS SOFTNESS AND THE PROTRUSION OF A LOT OF SHELLS. BLEND COATING WITH SOUND TABBY AT THE EDGES. SEE SPECS.

8. CLEAN ALL DARK AREAS UNDER WINDOW SILLS. SEE SPECS.

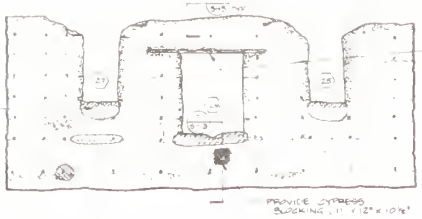
9. REMOVE ALL SPIDER WEBS FROM THE WALLS. SEE SPECS.

10. REMOVE ALL TRASH, ROOTS AND OTHER VEGETATION FROM ALL TIE HOLES. SEE SPECS.

11. PROVIDE CYPRESS LINTELS WHERE INDICATED. APPLY SLURRY STUCCO AND COATING TO ALL TABBY SURFACES BEFORE INSERTION AND INJECT SLURRY COATING INTO CRACKS BETWEEN TABBY AND LINTELS AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW LINTEL. SEE SPECS.



S. WALL – EXT. (CURING RM.) 1/5-9



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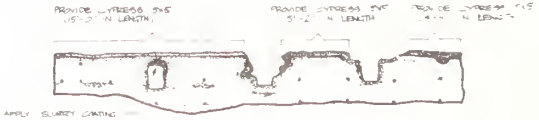
LOW N. WALL – S. ELEV. 5/5-9

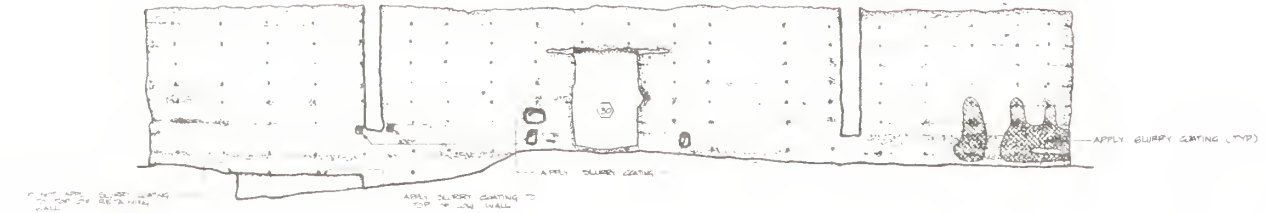
LOW N. WALL – N. ELEV. 6/5-9



LOW S. WALL – N. ELEV. 7/5-9

LOW S. WALL – S. ELEV. 8/5-9

W. WALL – INT. (CURING RM.) 3/5-9



E. WALL – INT. (BOILING RM.) 4/5-9

12. PROVIDE CYPRESS BLOCKING WHERE INDICATED. APPLY SLURRY STUCCO AND COATING TO ALL TABBY SURFACES BEFORE INSERTION AND INJECT SLURRY COATING INTO CRACKS BETWEEN TABBY AND BLOCKING AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW BLOCKING. SEE SPECS.

13. NEAR THE TOP OF THE LOW WALLS, INSERT A SPECIALLY-CUT CYPRESS 5" X 5" INTO THE EXISTING HOLES. WHERE ACCESSIBLE, APPLY SLURRY COATING TO ALL TABBY SURFACES BEFORE INSERTION AND INJECT SLURRY COATING INTO CRACKS BETWEEN TABBY AND 5" X 5" AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW 5" X 5". SEE DRAWINGS FOR REQUIRED LENGTHS. FIELD VERIFY DIMENSIONS. 5" X 5" MAY HAVE TO BE CUT INTO SHORTER LENGTHS THAN INDICATED IN ORDER TO SET IT INTO THE HOLES. SEE SPECS.

LEGEND

- REMOVE VEGETATION
- NEW SLURRY COATING
- REMOVE GRAFFITI
- REPAIR MISSING TABBY
- PROVIDE CYPRESS LINTEL
- EXISTING NUMBER

SCALE: 1/4" = 1'-0"

ELEVATIONS – STABILIZATION (sheet title) | sheet 9

MC INTOSH SUGAR WORKS, CAMDEN COUNTY, GA (project)

WC drawn	DTS checked	LE 84 date	9 of 9

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NERAL NOTES

1. ON THE NORTH SIDE OF THE NORTH BOILING ROOM WALL REMOVE THE TWO TREE STUMPS AND DIRT FILL NEXT TO THE WALL. CUT THE STUMPS FLUSH WITH THE ADJACENT GROUND LEVEL. DO NOT PULL OR EXCAVATE OR DO ANYTHING TO DISTURB THE GROUND. LEVEL THE GROUND TO CORRESPOND WITH THE ADJACENT GROUND LEVEL.

2. PROVIDE DIRT FILL IN AREAS INDICATED FROM AN OFF SITE SOURCE. MATCH SOIL TYPE FOUND ON-SITE. MATCH LEVEL OF SURROUNDING GROUND AND PROVIDE A PROTECTIVE SLOPE SEE SPECS

3. REMOVE ALL DEAD AND LIVE VEGETATION FROM TOPS OF WALLS AND COLUMNS AND WINDOW AND DOOR SILLS. IF REMOVING ANY ROOT WOULD CAUSE THE REMOVAL OF A LARGE PORTION OF THE TABBY, CUT THE ROOT OFF FLUSH WITH THE TOP OF THE WALL SEE SPECS

4. REMOVE ALL DEAD AND LIVE VEGETATION (ESPECIALLY MOSS LICHEN AND VINES) FROM ALL WALL SURFACES. THIS GENERALLY OCCURS NEAR THE TOPS OF THE WALLS NEAR THE GROUND AND BELOW WINDOW AND DOOR SILLS. SEE SPECS

5. ON THE TOP OF ALL HIGH WALLS AND COLUMNS REMOVE ALL LOOSE AND UNSOUND TABBY DOWN TO A SOUND SURFACE. APPLY A LIME BASED STUCCO AND SLOPE AS SHOWN IN DETAILS 1/S 13 , S 13 AND 1/S 13. BLEND STUCCO INTO TABBY AT EDGES SEE SPECS

6. ON THE TOP OF ALL WINDOW AND DOOR SILLS (EXCEPT OPENINGS 1 30 AND 31) AND THE LOW WALLS APPLY A LIME BASED SLURRY COATING 1/8" THICK. BLEND COATING INTO TABBY AT EDGES SEE SPECS

7. WHERE INDICATED APPLY A LIME BASED SLURRY COATING AT ALL LINTELS AND OTHER SURFACES ABOVE OPENINGS. MAKE 1" 8" THICK. CARRY IT FROM JAMB TO JAMB AND BLEND WITH TABBY AT EDGES SEE SPECS

8. WHERE INDICATED APPLY A 1/8" THICK LIME BASED SLURRY COATING TO ALL WALL SURFACES WHERE THE TABBY BINDER IS DETERIORATING. DETERIORATING TABBY CAN BE IDENTIFIED BY ITS SOFTNESS AND THE PROTRUSION OF A LOT OF SHELLS. BLEND COATING WITH SOUND TABBY AT THE EDGES SEE SPECS

9. STUCCO ALL CRACKS, INSIDE AND OUT, WITH A LIME BASED SLURRY. FINISH OFF FLUSH WITH THE EXISTING TABBY SURFACE SEE SPECS

10. CLEAN ALL DARK AREAS UNDER WINDOW SILLS SEE SPECS

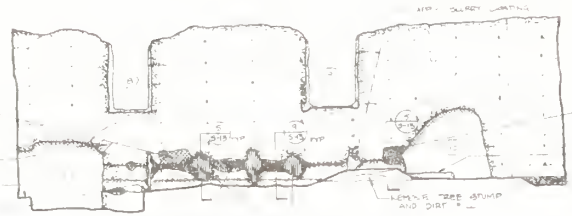
11. REMOVE ALL SPIDER WEBS FROM THE WALLS SEE SPECS

12. REMOVE ALL TRASH, ROOTS AND OTHER VEGETATION FROM ALL TIE HOLES SEE SPECS

13. REPOUR AREAS OF MISSING TABBY WHERE INDICATED MATCH ORIGINAL TABBY IN COLOR, TEXTURE, COMPOSITION AND POURING METHOD SEE SHEET 13 FOR DETAILS AND SPECS

14. ON THE INSIDE SURFACES OF THE VERTICAL HOLES AT THE BOTTOM OF THE NORTH AND SOUTH BOILING ROOM WALLS APPLY A LIME BASED SLURRY COATING 1/8" THICK. BLEND COATING INTO TABBY AT EDGES SEE SPECS

15. ON THE HORIZONTAL POUR LINES AT THE BOTTOM OF THE NORTH AND SOUTH BOILING ROOM WALLS WHERE THE WOOD FORMWORK BOARDS ARE EXPOSED TO VIEW APPLY A 1/8" THICK LIME BASED STUCCO OVER THE WOOD. RECESS THE STUCCO IN FROM THE SURFACE OF THE TABBY ABOVE AND BELOW. LEAVE ONE SECTION THE HORIZONTAL DISTANCE BETWEEN TIE HOLES EXPOSED TO VIEW IN EACH WALL FOR INTERPRETATION PURPOSES. WHERE THE WOOD IS NOT LEAVING A HOLE, INJECT A LIME BASED SLURRY COATING INTO TIE HOLE FILLING AS MUCH OF THE HOLE AS POSSIBLE. SEE DETAILS AND SPECS



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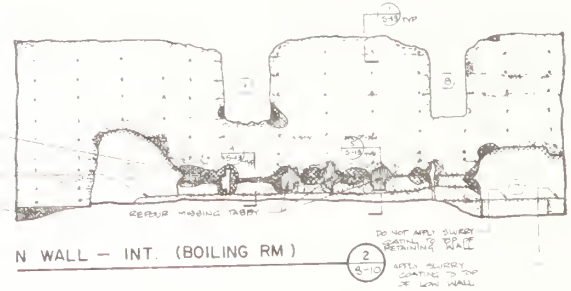

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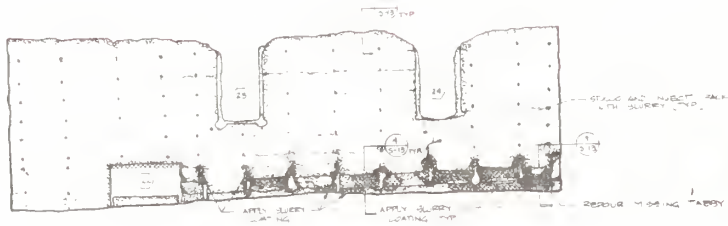
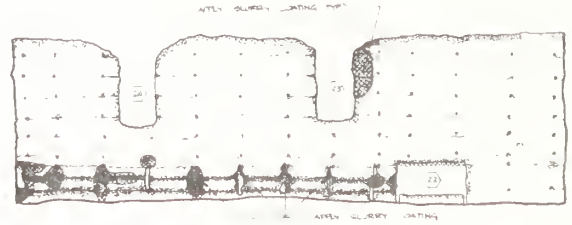
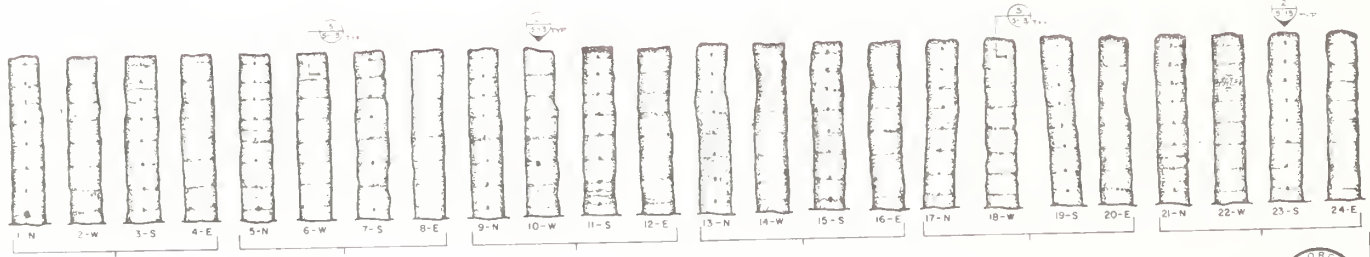


S. WALL – EXT (BOILING RM) 3 S-10



S. WALL – INT (BOILING RM) 4 S-10



COLUMN - 1 COLUMN - 2 COLUMN - 3 COLUMN - 4 COLUMN - 5 COLUMN - 6

LEGEND

- REMOVE VEGETATION
- APPLY SLURRY COATING
- PROVIDE DIRT FILL
- REPOUR MISSING TABBY
- PROVIDE PROTECTIVE SHIELD
- OPENING NUMBER

SCALE - 1/4" = 1'-0"

ELEVATIONS-STABILIZATION
sheet title
MC INTOSH SUGAR WORKS
CAMDEN COUNTY, GA
project

MD	BTS	DEC 84
drawn	checked	date

sheet 10 of 15

lee meyer and associates
architects and planners
217 E. Huntingdon St. P.O. Box 1713 Savannah Ga. 31402

GENERAL NOTES

1. PROVIDE DIRT FILL IN AREAS INDICATED FROM AN OFF SITE SOURCE. MATCH SOIL TYPE FOUND ON SITE. MATCH LEVEL OF SURROUNDING GROUND AND PROVIDE A PROTECTIVE SLOPE. SEE SPECS.

2. REMOVE ALL DEAD AND LIVE VEGETATION FROM TOPS OF WALLS AND COLUMNS AND WINDOW AND DOOR SILLS. IF REMOVING ANY ROOT WOULD CAUSE THE REMOVAL OF A LARGE PORTION OF THE TABBY, CUT THE ROOT OFF FLUSH WITH THE TOP OF THE WALL. SEE SPECS.

3. REMOVE ALL DEAD AND LIVE VEGETATION (ESPECIALLY MOSS, LICHEN AND VINES) FROM ALL WALL SURFACES. THIS GENERALLY OCCURS NEAR THE TOPS OF THE WALLS, NEAR THE GROUND, AND BELOW WINDOW AND DOOR SILLS. SEE SPECS.

4. ON THE TOP OF ALL HIGH WALLS AND COLUMNS, REMOVE ALL LOOSE AND UNSOUND TABBY DOWN TO A SOUND SURFACE. APPLY A LIME BASED STUCCO AND SLOPE AS SHOWN IN DETAILS 1/S 13, 2/S 13 AND 3/S 13. BLEND STUCCO INTO TABBY AT EDGES. SEE SPECS.

5. ON THE TOP OF ALL WINDOW AND DOOR SILLS (EXCEPT OPENINGS 30 AND 31) AND THE LOW WALLS, APPLY A LIME BASED SLURRY COATING, 1/8" THICK. BLEND COATING INTO TABBY AT EDGES. SEE SPECS.

6. ON THE TOP OF THE SILLS OF OPENINGS 1, 30 AND 31, PROVIDE A 12" THICK LIME BASED STUCCO. MAKE SMOOTH AND FOLLOW CONTOURS OF SILL. SEE SPECS.

7. WHERE INDICATED, APPLY A LIME BASED SLURRY COATING AT ALL LINTELS AND OTHER SURFACES ABOVE OPENINGS. MAKE IT 1/8" THICK. CARRY IT FROM JAMB TO JAMB AND BLEND WITH TABBY AT EDGES. SEE SPECS.

8. WHERE INDICATED, APPLY A 1/8" THICK LIME BASED SLURRY COATING TO ALL WALL SURFACES WHERE THE TABBY BINDER IS DETERIORATING. DETERIORATING TABBY CAN BE IDENTIFIED BY ITS SOFTNESS AND THE PROTRUSION OF A LOT OF SHELLS. BLEND COATING WITH SOUND TABBY AT THE EDGES. SEE SPECS.

9. STUCCO ALL CRACKS WITH A LIME BASED SLURRY. INJECT. FINISH OFF FLUSH WITH THE EXISTING TABBY SURFACE. SEE SPECS.

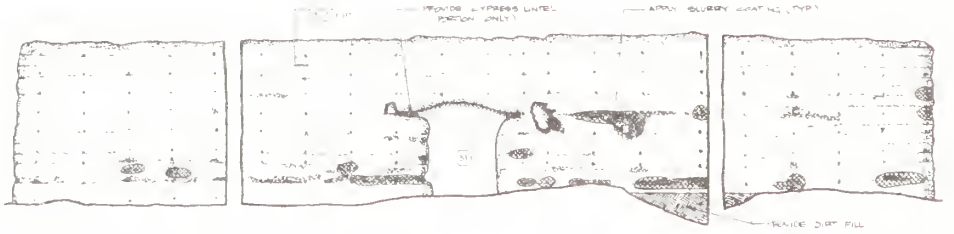
10. CLEAN ALL DARK AREAS UNDER WINDOW SILLS. SEE SPECS.

11. REMOVE ALL SPIDER WEBS FROM THE WALLS. SEE SPECS.

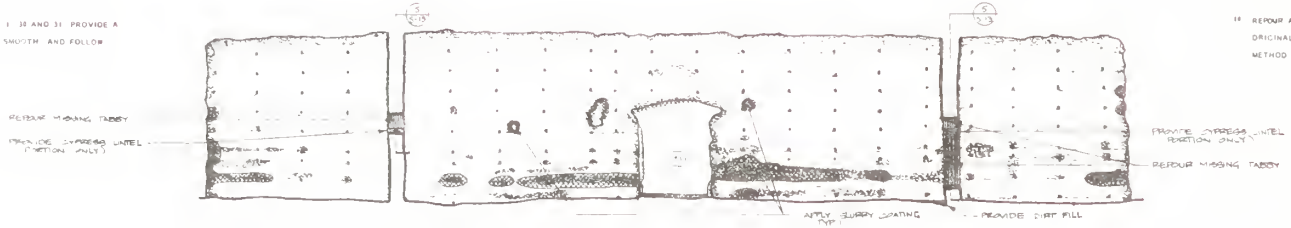
12. REMOVE ALL TRASH, ROOTS AND OTHER VEGETATION FROM ALL TIE HOLES. SEE SPECS.

13. PROVIDE CYPRESS LINTELS WHERE INDICATED. APPLY SLURRY COATING TO ALL TABBY SURFACES BEFORE INSERTION AND STUCCO AND INJECT SLURRY COATING INTO CRACKS BETWEEN TABBY AND LINTELS AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW LINTEL. SEE SPECS.

14. REPAIR AREAS OF MISSING TABBY WHERE INDICATED. MATCH ORIGINAL TABBY IN COLOR, TEXTURE, COMPOSITION AND POURING METHOD. SEE SHEET 13 FOR DETAILS AND SPECS.



W. WALL – INT. (BOILING RM.) 1/S-11



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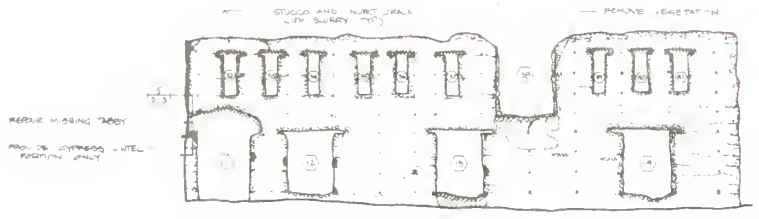
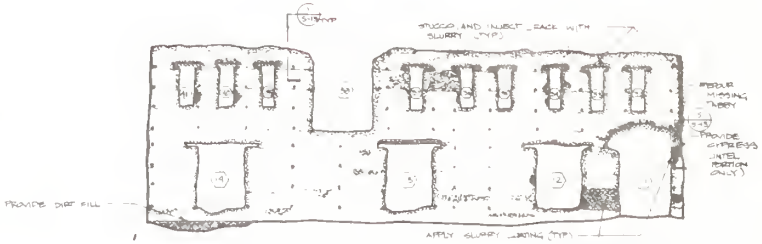


N. WALL – EXT. (MILLING RM.) 3/S-11



N. WALL – INT. (MILLING RM.) 4/S-11

LEGEND

- REMOVE VEGETATION
- APPLY SLURRY COATING
- PROVIDE DIRT FILL
- REPAIR MISSING TABBY
- PROVIDE CYPRESS LINTEL
- OPENING NUMBER

SCALE: 1/4" = 1'-0"

ELEVATIONS - STABILIZATION

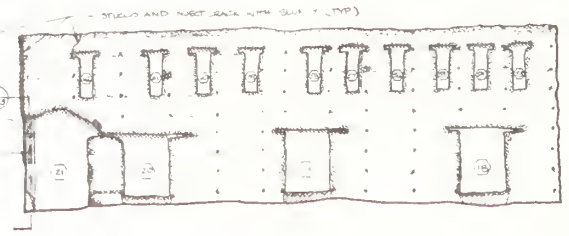
MC INTOSH SUGAR WORKS
CAMDEN COUNTY, GA.
project

MJO	BTS	DEC 84	11
drawn	checked	date	11 of 15

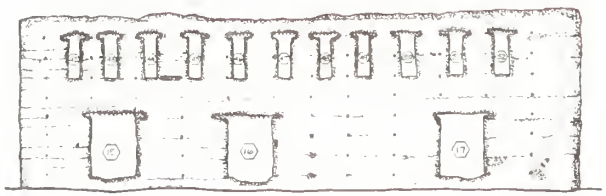
sheet no.

lee meyer
and associates
architects and planners
217 E. Bettington St., P.O. Box 1713, Savannah, Ga. 31402

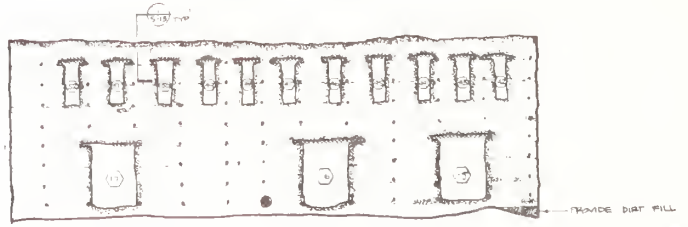
S. WALL – EXT. (MILLING RM.) 1/S-12



S. WALL – INT. (MILLING RM.) 2/S-2



W. WALL – EXT. (MILLING RM.) 3/S-12



W. WALL – INT. (MILLING RM.) 4/S-2

GENERAL NOTES

1. PROVIDE DIRT FILL IN AREAS INDICATED FROM AN OFF SITE SOURCE. MATCH SOIL TYPE FOUND ON SITE. MATCH LEVEL OF SURROUNDING GROUND AND PROVIDE A PROTECTIVE SLOPE SEE SPECS.

2. REMOVE ALL DEAD AND LIVE VEGETATION FROM TOPS OF WALLS AND COLUMNS AND WINDOW AND DOOR SILLS. IF REMOVING ANY ROOT WOULD CAUSE THE REMOVAL OF A LARGE PORTION OF THE TABBY, CUT THE ROOT OFF FLUSH WITH THE TOP OF THE WALL. SEE SPECS.

3. REMOVE ALL DEAD AND LIVE VEGETATION (ESPECIALLY MOSS LICHEN AND VINES) FROM ALL WALL SURFACES. THIS GENERALLY OCCURS NEAR THE TOPS OF THE WALLS, NEAR THE GROUND AND BELOW WINDOW AND DOOR SILLS. SEE SPECS.

4. ON THE TOP OF ALL HIGH WALLS AND COLUMNS, REMOVE ALL LOOSE AND UNSOUND TABBY DOWN TO A SOUND SURFACE. APPLY A LIME BASED STUCCO AND SLOPE AS SHOWN IN DETAILS 1/S-13, 2/S-13 AND 3/S-13. BLEND STUCCO INTO TABBY AT EDGES. SEE SPECS.

5. ON THE TOP OF ALL WINDOW AND DOOR SILLS (EXCEPT OPENINGS 30 AND 31) AND THE LOW WALLS, APPLY A LIME BASED SLURRY COATING 1/8" THICK. BLEND COATING INTO TABBY AT EDGES. SEE SPECS.

6. WHERE INDICATED, APPLY A LIME BASED SLURRY COATING AT ALL LINTELS AND OTHER SURFACES ABOVE OPENINGS. MAKE IT 1/8" THICK. CARRY IT FROM JAMB TO JAMB AND BLEND WITH TABBY AT EDGES. SEE SPECS.

7. WHERE INDICATED, APPLY A 1/8" THICK LIME BASED SLURRY COATING TO ALL WALL SURFACES WHERE THE TABBY BINDER IS DETERIORATING. DETERIORATING TABBY CAN BE IDENTIFIED BY ITS SOFTNESS AND THE PROTRUSION OF A LOT OF SHELLS. BLEND COATING WITH SOUND TABBY AT THE EDGES. SEE SPECS.

8. STUCCO ALL CRACKS, INJECT WITH A LIME BASED SLURRY. FINISH OFF FLUSH WITH THE EXISTING TABBY SURFACE. SEE SPECS.

9. CLEAN ALL DARK AREAS UNDER WINDOW SILLS. SEE SPECS.

10. REMOVE ALL SPIDER WEBS FROM THE WALLS. SEE SPECS.

11. REMOVE ALL TRASH, ROOTS AND OTHER VEGETATION FROM ALL TIE HOLES. SEE SPECS.

12. PROVIDE CYPRESS LINTELS WHERE INDICATED. APPLY SLURRY COATING TO ALL TABBY SURFACES BEFORE INSERTION AND INJECT SLURRY COATING INTO CRACKS BETWEEN TABBY AND LINTELS AFTER INSERTION. FINISH OFF FLUSH WITH EXISTING TABBY SURFACE AND NEW LINTEL. SEE SPECS.

13. REPOUR AREAS OF MISSING TABBY WHERE INDICATED. MATCH ORIGINAL TABBY IN COLOR, TEXTURE, COMPOSITION AND POURING METHOD. SEE SHEET 13 FOR DETAILS AND SPECS.

LEGEND

- REMOVE VEGETATION
- APPLY SLURRY COATING
- PROVIDE DIRT FILL
- REPOUR MISSING TABBY
- PROVIDE CYPRESS LINTEL
- OPENING NUMBER

12" 0 5 10'

SCALE: 1/4" = 1'

ELEVATIONS-STABILIZATION (sheet title)

MC INTOSH SUGAR WORKS
CAMDEN COUNTY, GA (project)

MD	BJD	DEC 84
drawn	checked	date

sheet 12

12 of 15

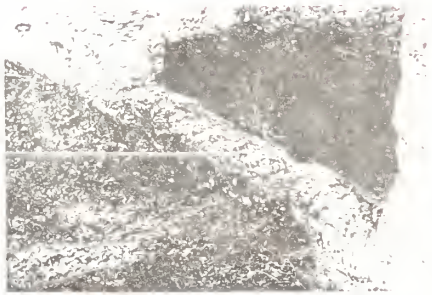
lee meyer
and associates
architects and planners
217 E. Huntingdon St., P.O. Box 1713, Beaufort, SC 29902

DETAIL OF TYPICAL GRAFFITI

DETAIL OF TYPICAL DETERIORATION ON TOP OF WALLS

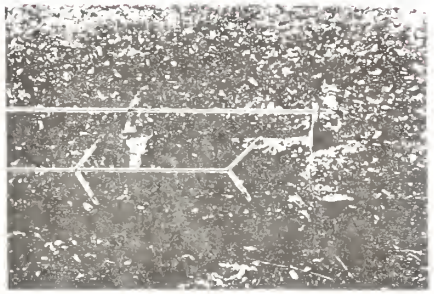
DETAIL OF EXISTING LINTEL AT OPENING # 5

DETAIL OF 5 X 5 POCKET AT TOP OF LOW WALLS



DETAIL OF TYPICAL DOOR SILL

DETAIL OF TYPICAL DETERIORATION AT BOTTOM OF NORTH BOILING ROOM WALL



DETAIL OF TYPICAL DETERIORATION AT DIVIDER BOARDS AT BOTTOM OF SOUTH BOILING ROOM WALL

DETAIL OF TYPICAL HOLE

PHOTOS - STABILIZATION

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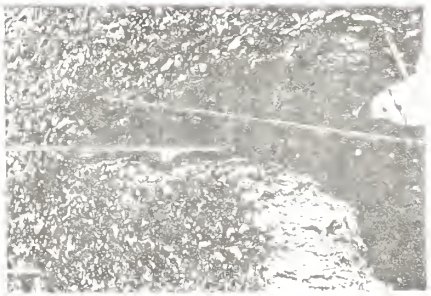
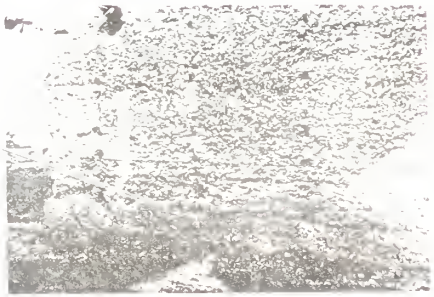


DETAIL OF DETERIORATED LINTEL POCKET
AT OPENING # 31



DETAIL OF TYPICAL TABBY WALL
DETERIORATION

DETAIL OF CRACK AT JUNCTION
OF MILLING/BOILING ROOM
WALL & MISSING TABBY PIER

PHOTOS- STABILIZATION
sheet title

MC INTOSH SUGAR WORKS
CAMDEN COUNTY, GA
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